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Bridges.

SINCE man first conceived the idea that streams and similar obstructions to locomotion might be spanned, the art of bridge construction has steadily advanced, but it is only within recent times that the principles underlying this useful art have been correctly appreciated. Some structures remaining to this day testify to the practical skill of early architects and engineers, and the whole history of bridge-building shows that the intellectual art of the designer has always been of great help to the practical art of the builder. The case serves to indicate the value and the limitation of architecture when it was little more than the refined expression of constructive work evolved from the practice of the artisan. Doubtless the natural laws governing bridge construction were dimly realised by early designers, and so stability and symmetrical proportion were secured. It must be remembered, however, that artistic or picturesque form may exist independently of that harmony between inherent strength and exterior force, which is an essential of scientific construction. So far, therefore, as the bridges of early times failed to exemplify the perfect combination of the grace inherited from art, with the knowledge derived from science, so far they failed to represent artistic construction as we know it to-day.

Bridge construction is undoubtedly a branch of architecture, using the term in its widest sense, although it has now come within the province of the engineer. We need not go far to seek the reason for this transference. In the first place, the design of an ordinary building does not involve any peculiarly difficult constructive problem; almost every point in connexion therewith is easily determinable by the aid of ascertained rules and established precedents. So the architect is to a large extent free to devote his thoughts to the development of artistic design. In the second place, the marvellous progress of engineering science within the last hundred years has been accompanied by the continual presentation of new and complex problems in construction as well as in other branches of engineering work. Hence the engineer is necessarily a man who is trained to find acceptable solutions for more or less novel problems, and his energies must primarily be occupied in the production of scientific design. In the third place, the comparatively recent advent of iron and steel as materials of construction has tended to take something from the confidence formerly felt by the architect in his absolute mastery of constructional work, and has excluded him from dealing with iron and steel construction on a comprehensive scale. The general result is that, while the average architect may be admirably qualified as a judge of artistic details and architectural treatment, he cannot be expert in the primary design of a modern bridge. On the other side, while the engineer may be competent to appreciate the scientific features of a bridge and to produce designs strictly suitable for any given statical and dynamical conditions, he cannot claim to be an expert in that architectural treatment, which is a necessary adjunct to scientific design in some bridges.

Here we may add that an "engineer" is not necessarily competent as a "bridge designer," for the design and construction of really good bridges can only be satisfactorily carried out by engineers who are specially qualified for such work.

It is, therefore, to the "bridge engineer" as a specialist that we must look for the solution of the many difficult problems presented by modern bridge design.

So far as the work of the engineer is concerned, we must observe that the laws governing bridge construction are in themselves conducive to artistic forms, and in many bridges the addition of any external adornment would be utterly incongruous. The parallel beam, in its simplest form, is the instrument by the aid of which the key to scientific bridge design has been wrought. A simple geometrical figure, such as that exemplified by the parallel beam, is unobjectionable in itself, and may be employed with appropriate effect in certain situations. Yet, as a form of bridge construction, the parallel girder is not of perfectly scientific design, for its outline is only maintained to an approximate degree by strenuous opposition to natural laws. The bending moments at different sections of such a beam have different values, and if the beam is to be of ideally correct design its resistance must be proportioned to the bending moment at every section. It follows, then, that a beam of uniform section must be unnecessarily strong at some places if it is to be strong enough at the place where the maximum bending moment has to be resisted. A little reflection will show that before the section of a beam can be regulated properly, some precise knowledge is required as to the variation or graduation of force to be resisted at all cross sections. The first essential of scientific bridge design is, therefore, the determination of bending moments for all possible conditions of loading, and to those who desire information on the subject we commend the classical treatise on Bridge Construction written by Professor Claxton Fidler.* This comprehensive work includes much relating to the subject that cannot possibly be discussed in an article such as the present, but we may say that a careful perusal of its pages will enable the reader to form some idea of the theoretical and practical problems involved in the art and science of bridge construction. Our attention will merely be directed to such parts as refer to the general question of bridge design. For the purpose of providing adequately for a perfect appreciation of the general theory, the author devotes four preliminary chapters to necessary definitions of terms, to the opposition and balance of forces, to bending strains, and to the graphic representation of bending moments. The last of these is not only useful to all who may be concerned in the application of beams to any class of

* "A Practical Treatise on Bridge Construction: A Text-book on the Design and Construction of Bridges in Iron and Steel." By T. Claxton Fidler, M.Inst.C.E. Third Edition. London: Charles Griffin & Co. 1901.

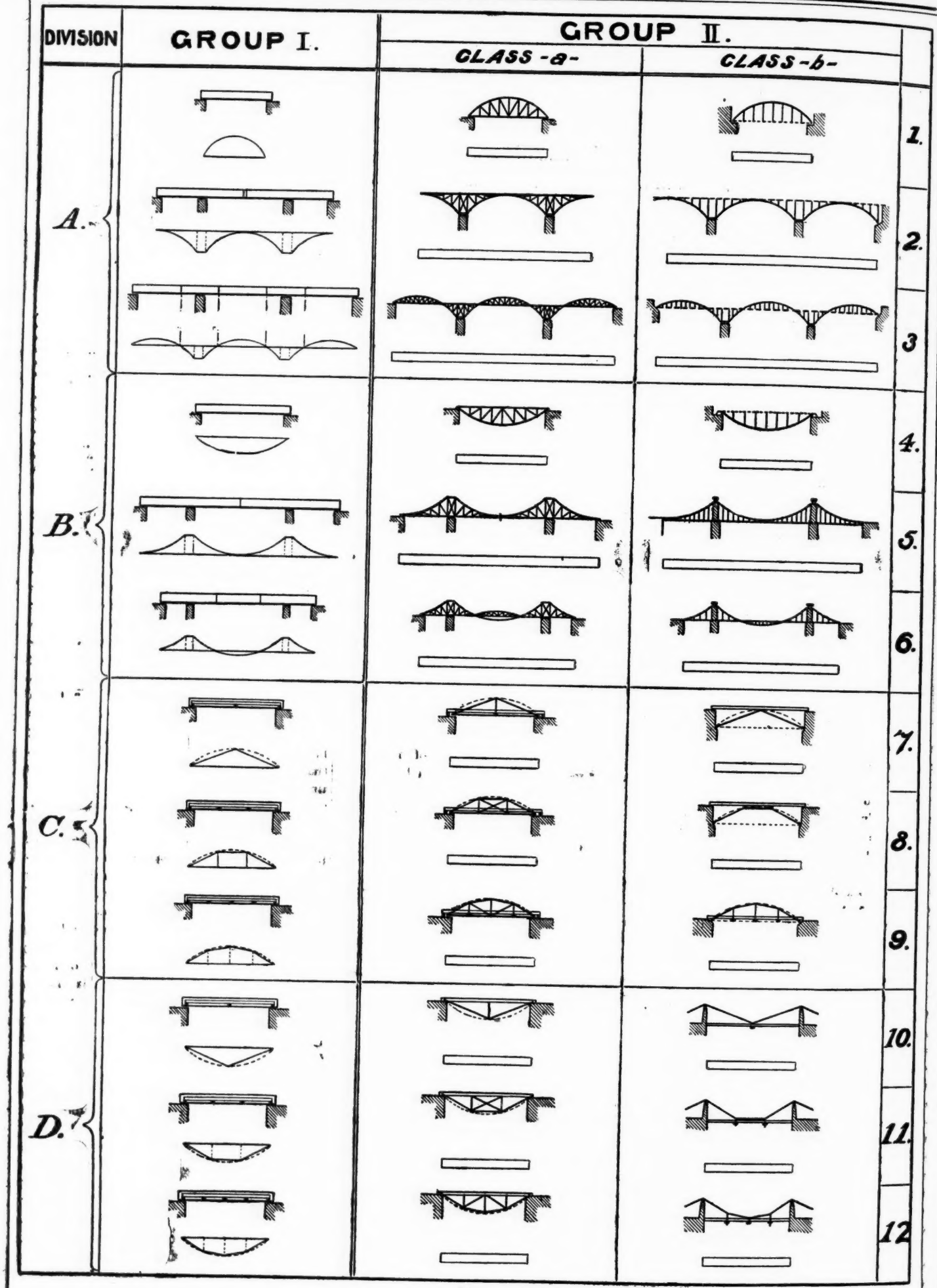


Fig. 1.

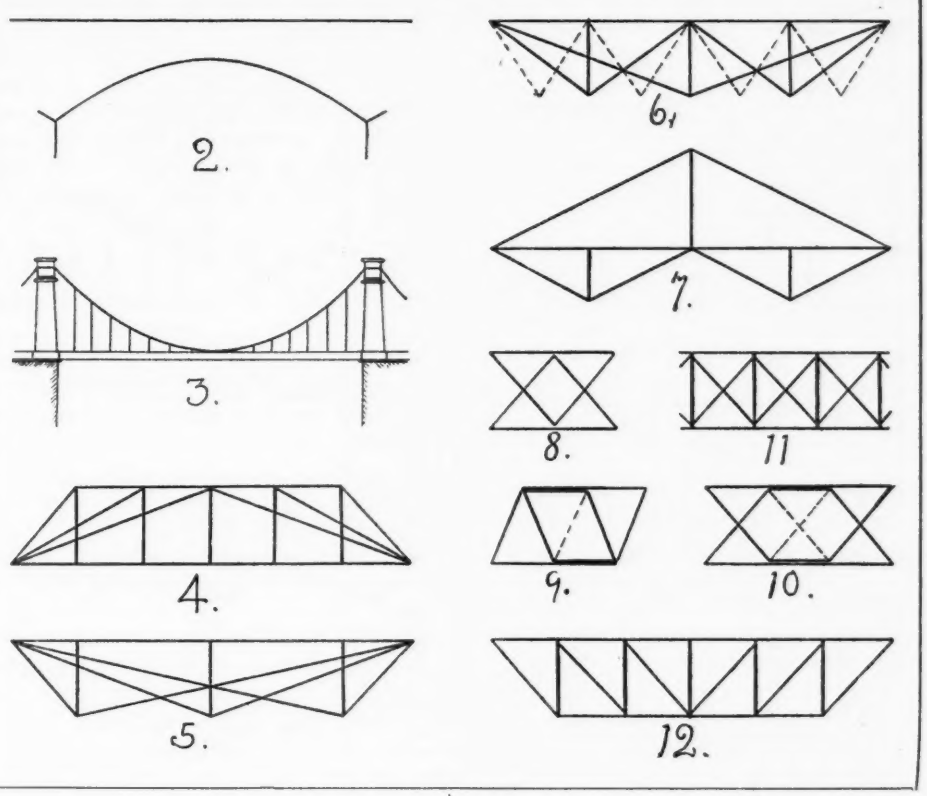
structure, but it demonstrates the diagram of bending moments to be an essential aid to all bridge design. As a diagram of bending moments varies in outline according to the magnitude and distribution of the load, it is obvious that such a figure must be of the utmost value to the designer in settling the general form and details of a bridge, and it should be added that it is applicable to every possible form of bridge that can be suggested. Diagrams of bending moments throw light upon the comparative economy of different types; they indicate the figure to be adopted in certain types; the stress to be provided for; and the sectional area required to ensure uniform stress at all points in parallel girders, or the variations of stress in girders of uniform section. Professor Fidler classifies different forms of bridge construction according to the distinctive mechanical features of their

structure. To illustrate the two main groups into which bridges of all kinds may be divided, we will first consider the case of a solid beam under uniform load, as on the first line of group I of fig. 1. The diagram of bending moments will then be of parabolic form, as represented below the beam. Then, using Professor Fidler's words: "If the girder is formed with straight parallel flanges, or if the depth of the girder is uniform, the flange stress will be everywhere proportional to the bending moment, and we may take the diagram of moments as representing, on a certain scale, a diagram of flange stress." Next, we will consider the case of a parabolic girder proportioned to the diagram of moments mentioned above. Such a girder is illustrated in line 1 of group II., and the diagram of bending moments is represented below the girder. It follows, as the author says, that "the horizontal stress in each flange will be uniform throughout the length of the girder."

It should now be clear why the diagram of moments is said to be the key to bridge design. By varying the distribution of the load and by increasing the number of the supports, an endless variety of diagrams may be obtained, suggesting outlines for an equally infinite number of bridges, wherein the depth of girder will be everywhere proportional to the bending moment, and the flange stress will be uniform throughout the length of the girder. The classification adopted by Professor Fidler in the chapters headed "The Comparative Anatomy of Bridges" shows very clearly how different designs can be deduced from the diagrams of bending moments, and the plates with which the chapters are illustrated are extremely serviceable. In his classification there are five divisions, each comprising three groups, the divisions being the following:—(A) Structures affording continuous support to the uniform load; (B) structures of Div. A, inverted; (C) structures supporting bearers which carry the uniform load; (D) structures of Div. C, inverted; and (E) "composite" and "combined" structures. On looking into this system of classification we find that the two characteristic groups, to which reference has been made, are insufficiently emphasised, but this disadvantage can readily be overcome by a slight rearrangement of the essential forms described by the author. Thus, if we make two main groups, the second of which is divided into two classes, and if each of the three classes so obtained comprises divisions corresponding with (A) to (D) of the author's classification, we have the following scheme:—

Group I.—Bridges of uniform section.
Group II.—Bridges of uniform strength.
Class *a*.—Proportional girders.
Class *b*.—Arches and suspension bridges.

The Divisions A to D are those of Professor Fidler. Division E, covering combinations which may exhibit the attributes of either Group I. or Group II., should be considered separately. For the purpose of making clear the grouping of different forms of bridge design, we reproduce in fig. 1 a selection from the illustrations contained in the four plates of the work by Professor Fidler, but the arrangement is that indicated by the revised grouping. Below each of the figures is a diagram of the bending moments, or a stress-diagram if we decide to so regard it, which suggest the derived forms belonging to Classes *a* and *b* of Group II. All the diagrams here given refer to the uniform load only. In Division A of Group I., the uniform load, continuously supported by the main structure, gives different diagrams according to circumstances. On line 2, each half of the bridge is a cantilever independent of the other for support, this condition being clearly suggested by the diagram of moments below. On line 3 we have a cantilever bridge with a central girder connecting the projecting ends of the cantilevers, and if the two vertical lines were omitted, the figure would also serve to illustrate a "continuous girder" bridge. The next three lines of Group I. show parallel girders which are the same as those in lines 1, 2, and 3, but the diagrams of moments are drawn in the inverted position for comparison with the other designs on the same lines. Glancing now at the figures in Class *a*, Group II., we see that each bridge takes the form indicated by the stress-diagram of its prototype. Horizontal stress in the flanges of the "bowstring" girder, line 1, is uniform from end to end; tension throughout the tie being entirely due to the thrust of the bow, or, conversely stated, compression of the bow is due entirely to the pull of the tie. The same conditions are present in the parabolic cantilever bridge, line 2, and the cantilever and bowstring bridge, line 3. In structures of this class the web neither transmits stress to the flanges nor is called upon to resist shear, the two principal members would constitute the complete bridge if no roadway were required, and the web is quite superfluous for the support of the uniform load. This leads us up to Class *b*, Group II., of which the figure on line 1 is a typical example, where the thrust of the bow is received by abutments, so that the structure becomes an "equilibrated linear arch," which is in equilibrium because its curve corresponds with that of the diagram of moments. It should be observed that the resisting couple here consists of the horizontal stress of the arch, and a horizontal force acting along the line of an imaginary tie, as shown by a dotted line in the figure. A similar effect is produced in the cases indicated by the figures on lines 2 and 3, and, as Professor Fidler says, "the curve of moments for any given load represents the figure of a linear arch which would be in equilibrium under that load." In the three examples mentioned the roadway has no direct stress under the uniform load, and it may be at any desired level. The first two of these diagrams are particularly interesting because they directly explain the general theory of the masonry arch. Thus, if we add a roadway to the diagram on line 1 we have at once the familiar design outlined in fig. 2. In connexion with masonry bridges, it should be noted that the traditional error of building arches with voussoirs of uniform depth was first corrected by Rennie, an engineer who left, in London Bridge, a permanent demonstration of the fact that science is the essence of truly artistic design. Inversions of the structures in Division A give designs of different appearance, as in lines 4, 5, and 6, and the character of the stress is reversed, so that the straight members become struts instead of being ties, and the curved members are in tension instead of in compression, In Division B the suspension bridge takes the place of the arch in Class *b*, and the equilibrium of the chain or cable is due to the correspondence of its figure with that of the curve of the inverted diagram of moments, which, as the author says, "for any given load, represents the figure which would be assumed by an equilibrated flexible chain under that load." A variation of the diagram on line 4 gives a suspension bridge without side spans, as shown in fig. 3. Looking next at the remaining illustrations of Group I., we notice that the concentration of the uniform load at one or more points along the main structure changes the diagram of moments from the parabolic to the polygonal form, the number of sides varying with the number of points at which the load is applied. As before, arches are derived in Class *a* from the upright diagram of moments, and suspension bridges in Class *b* from the inverted diagrams, reversal of stress again occurring in the inverted forms.



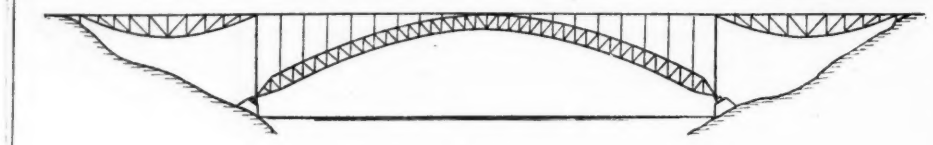


Fig. 13.

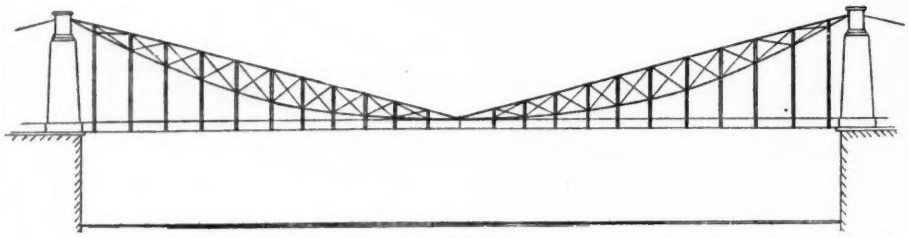


Fig. 14.

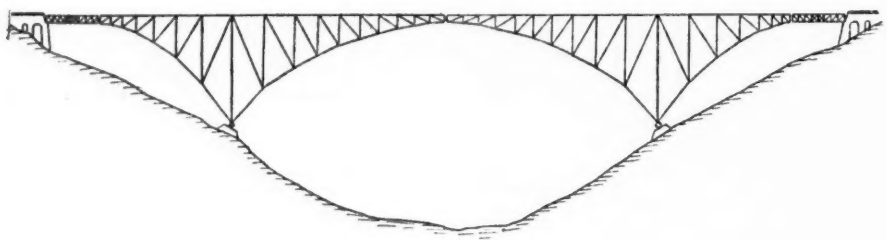


Fig. 15.

Some of the diagrams given by Professor Fidler represent purely ideal designs, evolved from stress diagrams, but each one is merely a solitary example of the innumerable variations that can be produced in a similar manner. An interesting modification of Group II. is the bow-and-chain, or Saltash, girder, so called after Brunel's well-known bridge. The "hog-backed" girder is a form intermediate between the parallel and the parabolic types, and cantilevers may be similarly modified with great advantage. Intermediate forms permit the adjustment of stress intensity to suit the special conditions of any case, and enable the engineer to qualify theory by the teachings of practical experience. The chapter in which Professor Fidler treats of his Division E is worthy of careful study. This division includes "composite" and "combined" structures, with the first of which we are chiefly concerned. The composite truss is a structure where elementary figures, such as those in lines 7 and 8 in Class *a*, are used to carry the loads, and to exert force at the ends of one base common to all the figures. The truss then possesses attributes which resemble those belonging to the simple forms of which it is composed. An early bridge truss of this kind is shown in fig. 4, where the primary figures are trapezoid with the exception of the centre panel. The Bollman truss, fig. 5, consists of any required number of triangular trusses; and the Fink truss, fig. 6, is composed of primary, secondary, and tertiary systems of triangles.

By applying upright and inverted truss systems on opposite sides of the common base, as in fig. 7, stress in the horizontal member will be reduced, because it will then act as a tie for one system, and as a strut for the other. Again, triangular truss forms may be used in the upright and the inverted position, as in fig. 8, so as to form a lattice girder, the upper flange of which is the base of the inverted system, and the lower flange is the base of the upright system. The bending moments and flange stresses are then calculable by the methods adopted in the case of ordinary beams, but it must be remembered that flange stresses are communicated, step by step, through the web bracing. Trapezoidal truss forms may be similarly employed, as in figs. 9 and 10, in each of which two trapezoids, one upright and one inverted, are shown in full lines, and others completing the bracing are in dotted lines. Vertical posts may be added to all such combinations of triangular and trapezoidal trusses, as illustrated in fig. 11. By methods such as these all the familiar forms of latticed bracing are produced. An important difference between English and American ideas of the braced girder is pointed out by the author. "In England," he says, "the simple beam was refined into a plate girder, and the plate web was improved by the substitution of diagonal bracing. But in America bridge construction was at first very largely carried out in timber, or in combinations of timber and wrought-iron, and these materials were framed together in various forms of truss, from which the wrought-iron trusses of the Linville, Whipple, and other types have been developed." Fig 12 is a diagram of the Linville truss in a simple form. Although the forms of lattice girder so developed are very similar in both countries, the American engineer still calls his girder a "truss," and specially considers each member as performing a distinct function. In tension members he makes free use of pin-connexions, while in England the engineer generally prefers riveted joints, and strives to make the riveted girder as much like a rigid plate girder as he possibly can. One result is that American bridges cost proportionately less, and can be erected far more rapidly than English bridges. Some bridge engineers in this country have already recognised this advantage of the American system, but in a general way it is still looked upon with a certain amount of suspicion.

We must now reluctantly pass by several chapters devoted by Professor Fidler to 'Deflection," "Continuous Girders," and "The Strength of Materials," the last-named being treated in a manner that should commend it as much to architects as to bridge engineers. "The Design of Bridges in Detail" is a subject which takes up nearly all the remaining chapters of the treatise, and in them the author deals successively with "The Load on Bridges," the "Calculation of Stresses due to the Movable Load," and then approaches the detailed consideration of "Parallel Girders, Parabolic Girders, Polygonal Trusses, and Curved Girders," "Suspension Bridges and Arches," of flexible and rigid construction, and "Continuous Girders and Cantilever Bridges." The last chapter of all relates to the most important subject of "Wind-Bracing." As may naturally be expected, most of the matter presented in the chapters mentioned refers to construction pure and simple, but there is a good deal that relates to design, which, of course, is inseparable from construction. There are also data which will be found extremely useful to anyone who may be called upon to express an opinion as to the choice of a design in cases where alternatives are available. To a brief consideration of the latter features our attention will now be confined. A reliable estimate of the weight of a bridge is a matter of much importance. It serves to indicate the comparative cost of different designs, and it may govern the choice of design by showing that some forms of construction would be difficult, impracticable, or impossible under certain conditions. All calculations of the strength and dimensions of different members must be based upon estimated stresses due to (1) the unknown weight of the main girders; (2) the ascertained weight of the roadway or platform; and (3) the rolling or live load. The method formerly adopted for arriving at the probable weight of the main girders was that of trial-and-error, a roundabout and unscientific procedure that is rendered unnecessary by newer modes of computation. Professor Fidler explains at some length his system of calculation, by the aid of which the necessary sectional areas of metal for tension and compression members may be estimated by one direct computation, applicable with approximate accuracy for calculating the weight of the main structure in nearly every form of bridge. The formula and tables given by the author make it possible for any one to calculate the approximate weight of the main structure for any width of span, depth of girder or dip of span, and weight of load. A modification of the same formula also serves to indicate the theoretical limit of length for any similar bridge. As Professor Fidler's work was originally written at a time when the use of steel was less prevalent than it is in the present day, many of the calculations relate to wrought-iron bridges. This is not altogether a disadvantage, because it enables the reader to compare the weights of various well-known wrought-iron and steel bridges. In order that it may be easy to make comparison between different types of design, we have summarised some of the results in tabular form. Table 2 shows the weights of various bridges of certain spans, and Table 3 shows the theoretical span limit for different types. In parallel girders economy is chiefly effected, in long spans by the weight of the main girders, and in small spans by the weights of the platform, wind bracing, and the live load. The percentage of waste material is much greater when the tension members are riveted, as in European practice, than when they are pin-connected, as in American practice. This point will be made clear by comparing Nos. 1 and 2 of Table 2, where it is shown that if the Ohio

Bridge had been made on the European system, the cost would have been increased by nearly 36 per cent. So far as design is concerned, it appears that different types of parallel girder do not vary largely in cost, and that no single type can be considered as the best for general use. Speaking generally, economy is promoted by the adoption of liberal depth in proportion to length, but it is impossible to fix a ratio applying to all cases. With regard to the limiting span, it should be mentioned that it would be practically impossible to build a parallel girder bridge 802 ft. long, because, as the author remarks, "the amount of metal required to carry any useful load would be infinite." Parabolic girders, polygonal trusses, and curved girders may be treated on the same principles, but it should be remembered that no vertical shear is resisted by the diagonals under a uniform load, and that their function is to resist vertical shear due to irregular loading. With regard to weight, the figures stated on line 3, it affords a yielding support to the roadway. The weight given in Table II. does not include backstays or side spans, nor the towers or end pillars. It would be impossible to state any general rule for estimating the comparative economy of the suspension bridge as a whole. In many situations it would not be an economical type, especially in spans of moderate width. In spans of much greater width than 500 ft. the girder type would of course become impracticable.

Various devices, most of them unsatisfactory, have been adopted for the purpose of stiffening and staying flexible suspension bridges. Professor Fidler rightly advocates the construction of rigid arches and suspension bridges, in which no deflection shall be possible beyond that due to the elasticity of the material. This ideal may be attained by designing the arch or suspension rib as a deep and stiff girder. In each case provision must be made for expansion and contraction by suitable hinging

TABLE II.—*Estimated Weights of Main Structures of Bridges*
(Suspension bridges are exclusive of towers, backstays, and anchorages).

Description.	Span in feet.	Span ÷ depth.	Load per foot span.	Weight per foot span.	Remarks.
			Tons.	Tons.	
Wrought Iron—					
Linville Truss (American system)	515	10	1·35	1·80	Ohio Bridge.
" " (European ")	515	10	1·35	2·44	
Bowstring Girder	500	10	1·70	2·40	
" "	500	8	1·70	1·78	
Bow and Chain Girder	500	8	1·70	1·75	− platform.
				1·90	+ "
Flexible Suspension	500	10	1·70	·53	− "
				1·09	+ "
Rigid "	500	10	1·70	·76	− "
				1·52	+ "
Flexible "	1,000	10	3·40	2·70	− "
				3·75	+ "
Rigid "	1,000	10	3·40	4·10	− "
				5·15	+ "
Steel—					
Rigid Suspension	1,500	8	3·2	3·94	− "
				4·80	+ "
" "	2,000	8	3·2	7·50	− "
				8·50	+ "
" "	3,000	7	3·2	31·40	− "
				32·60	+ "
Cantilever	1,500	—	—	7·60	Complete with platform, end pillars, and bracing.
"	2,000	—	—	13·20	
"	3,000	—	—	81·25	

TABLE III.—*Theoretical Span Limits for different Bridges* (*factor of safety* = 4).

Type.	Span ÷ depth.	Theoretical Limit.
		ft.
Parallel Girder ..... W.I.	10	802
Parabolic " ..... "	8	960
" " ..... "	4	1,600
Flexible Suspension "	10	2,100
" " "	8	2,560
Rigid " Steel	10	2,700
" " "	8	3,250
" " "	7	3,550
" " "	6	4,000

of Table II., do not include the platform, but as the load is greater there is not much difference on the score of economy between this example and the Ohio bridge. From Table III. it may be inferred that the parabolic girder must be more economical than the parallel type in spans of more than 500 ft., and it is the fact that the advantage secured by increasing the ratio of depth to length is much more marked. The chain or cable suspension bridge is the most economical form of construction possible, but it is always under the disadvantage that —at each end, at each end and at the centre, or near one end. Fig. 12 is a diagram of the Niagara Falls rigid arch bridge, and fig. 13 is taken from the author's work to illustrate the rigid form of suspension bridge. By reference to Table II. it will be seen that the rigid suspension bridge compares favourably with other types of bridge design, although there would probably be no saving in a span of 500 ft. For wider spans the superiority of the suspension type over any form of girder is abundantly demonstrated. For a span of 1,000 ft. the weight of two suspension bowstring ribs would not be more than that of a 500-ft. bowstring girder, and while the weight of a suspension span without towers and backstays would be about 5·15 tons per ft., the weight of a bowstring girder, as estimated by Sir B. Baker, would be 46 tons per ft. if it were possible to build such a structure. The last type of bridge construction to be noticed is that embodying the continuous girder and the cantilever. In the continuous girder the stresses and points of "contrary flexure" are only to be found by abstruse calculations, but if these points be mechanically fixed by the introduction of hinges in suitable positions, all complication is removed and the structure becomes a cantilever bridge of the type outlined on line 3 of Table I. A fine example of cantilever construction is afforded by the new viaduct over the Viaur, in France, of which fig. 14 is a diagrammatic representation. Here, the cantilevers are supported on rocking bearings, they are joined at the centre by a hinged connexion, and the side spans are anchored at the abutments. The centre span is about 720 ft. wide, and the side spans are each 310 ft. wide. The figures quoted in Table II. as to the weight of cantilever bridges are those given by Sir B. Baker in his work on "Long Span Bridges."

Referring to the relative economy of different forms of bridge construction, Professor Fidler expresses the opinion that there is no form of bridge that can be regarded as the most suitable for all situations. It will, of course, be evident by reference to the tables that the various forms of girder bridge are out of the question for very wide spans, when the suspension of cantilever types are the only alternatives. For moderate spans there appears to be little difference between the cost of different forms of construction. Therefore, unless some urgent practical requirement or constructional difficulty be evidenced, there is no reason why an ugly or inharmonious design should be selected when a more pleasing one could be adopted. The engineer may be able to point to two or more types as equally suitable, or he may sometimes have to say that a certain type of design is the only possible one. In the former case the architect may be able to show that of two alternatives one is the more suitable, or that one of them is absolutely inappropriate, and in either case there may be features which must be considered from a purely æsthetic standpoint. In the earlier part of this article, we suggested what are probably the modes of thought most natural to the two professions, whose relations may be compared to those existing between brother and sister. However much the architect may enjoy the practical details of his calling, he appreciates still more keenly the artistic features of a beautiful work in the finished state. He is attracted primarily by the beauty of external form, while the engineer at once seeks the skeleton upon which the form is based, and finds enjoyment of another sort in studying the principles underlying its construction. In creative work the same difference is inevitable. The architect has ever before him the problem of reconciling practical requirements with pure art, while the engineer is chiefly concerned in finding practical solutions for scientific problems. Many engineers undoubtedly possess a true appreciation of fine art, but that is a natural gift, which is rarely encouraged or cultivated by professional training. Therefore in connexion with bridge construction occasions may arise when the art of one profession may usefully supplement the science of the other in the proper rendering of the auxiliary features of a generally good and artistic engineering design. Further, admitting that any bridge must be in good taste that is designed in accordance with natural laws, it does not follow that it would be good taste to place such a structure where it would be out of keeping with its surroundings, and so

far as æsthetic considerations of this kind are involved, the architect is clearly entitled to be heard. As to the general subject of bridge construction, it is manifest that neither the average architect nor the average engineer is qualified to be a bridge designer, for the practice of this particular department of mechanical science demands men who are fitted for it by mental aptitude, and, above all, by special training and experience.

NOTES.

Electric Railways.

It seems highly probable that there will soon be several different systems of electric traction in use for railway work in this country. From the point of view of "standardization," it is a pity that electrical engineers can invent an almost infinite number of systems, the relative advantages of which are most difficult to measure accurately. Company promoters come too often to Parliament and ask for powers to construct electric railways, ordinary gauge or mono-rail, the technical details of which have hardly been attacked. Fortunately, other countries are now supplying us with experimental data of the greatest value. At the opening meeting of the American Institution of Electrical Engineers Mr. Lamme described the new single phase railway equipment of the Westinghouse Co. which is being applied to a full gauge railway, thirty-one miles long, connecting Washington and Baltimore. The Company has adopted this as their standard system after elaborate experiments, and it differs in almost every detail from the ordinary direct-current trolley railways. The line is designed for short trains running at speeds of over forty miles an hour, and the test-room results given by Mr. Lamme are most promising. In Germany, Siemens and Halske have been experimenting with electric locomotives on the high speed experimental railway near Berlin. Speeds of 100 miles an hour have been obtained, and if the line had been laid with heavier rails, still higher speeds would have been possible. Siemens use three-phase alternating current at 10,000 volts, which is led direct to the motors by means of three trolley bows and no transformers or other pressure-reducing devices are used. The safety of the passengers so far as shock is concerned, is almost absolute, as everything in the trailer cars is in direct connexion with the earth. It is found that forced lubrication has to be adopted at high speeds. These high speeds are possible only on straight lines, they would be quite impossible on most of the railways in this country owing to their curvature. Siemens and Halske are now preparing for a series of tests on heavier and better-fixed rails, and as the latest locomotive is about thirty per cent. lighter than the older one with which the high speeds were obtained, much better results should be shown.

Oil Motor-cars.

In a paper read recently before the Institution of Mechanical Engineers, Captain Longridge discusses various technical points connected with the manufacture of oil motor-cars, in which engineers know that there are many features admitting of improvement. Ordinary users of the highway have also arrived at a similar conclusion, and the paper in question should therefore be of general interest. Some hopelessly impossible people would like to see motor-cars improved off the face of the earth altogether, but reasonable human beings would be satisfied with an autocar capable of travelling quietly without leaving a comet-like tail of perfume in its track, and of standing still or moving slowly without external manifestation of that suppressed excitement which at present characterises these latter-day vehicles. Something has already been done towards the attainment of these objects, and Captain Longridge makes several useful and practical suggestions in the same direction. He believes that the motor itself can be improved by assimilating it more to the character of the steam-engine, and that steady running will be secured by giving one impulse to every revolution. There is very probably room for a new engine constructed on this principle, which should greatly facilitate steady action at slow speeds. Silencers at present in use are considered to be too small, and it is tolerably certain that they are capable of much improvement. Referring to the fly-wheel, the author attributes to the inertia of this part a great deal of the vibration in a motor-car. So far as we are aware, the only satisfactory method by which excessive vibration can be eliminated is by using two fly-wheels running in opposite directions. This principle has been applied with good results to one or two makes of English and French cars. Experimental inquiry is clearly to be desired with regard to oil-motors, and the suggestion is worth consideration that the Institution might be well advised in extending the scope of the existing Gas-Engine Research Committee to the investigation of the many problems now surrounding and impeding the progress of the petrol-engine.

Foretelling Thunderstorms.

We suggested a few months ago that the newly-discovered radio-active substances might be useful in connexion with lightning conductors, as they have the property of making all the air surrounding them an excellent conductor for electric discharges. We pointed out, however, that these substances would probably lose their properties if continually exposed to the weather, and so their use might be limited to the periods when a thunderstorm is actually approaching or is threatening. In overhead traction or power transmission systems, there are always engineers in attendance who can take the requisite precautions during storms, but for lightning conductors for buildings if special appliances have to be put in the circuit an hour's notice at least would be requisite beforehand. Now M. Turpain, in *L'Eclairage Electrique* for last month, gives a complete account of a highly ingenious method he has invented for foretelling thunderstorms which has been successfully employed in practice. The tests were made under the auspices of the Agricultural Syndicate of Saint-Emilion, who have practised for more than two years the method of cannonading thunder clouds to prevent the formation of hailstorms in the wine districts. M. Turpain places several coherers similar to those used in wireless telegraphy in connexion with a copper wire run up a small mast. These coherers are of different degrees of sensitivity, the most sensitive giving signals whe a storm is 250 miles off, and the least sensitive only acting when it is nearer than fifty miles. Recording intsruments are used, so that the times that the various coherers come into action give valuable information as to the progress of the storm and the speed with which it is advancing. Since it has been set up there have been three storms which were duly foretold four, three, and two hours and a half before they came. It seems to us that the apparatus of M. Turpain would be of great value in meteorological stations, and would make possible the use of special methods of protecting buildings during thunderstorms.

St. Bartholomew-the-Great, West Smithfield.

A fund has been opened for rescuing the remains of the western cloister which stand in Bartholomew-close on the southern side of the site of the nave of the Augustinian Priory Church, and have been used during late years as Scrivens's forge, and as stables Some interesting views of the cloisters will be found in J. W. Archer's "Vestiges of Old London," 1851, and in the Archer collection at the British Museum. They are plotted on a plan made by J. Carter, the "Architect" of the *Gentleman's Magazine*, in 1791, which belonged to Britton: see vol. I. of Britton and Lekeux's "Church Architecture," 1838, and the plan, of about 1530, published in our columns on May 8, 1886. The south side of the cloisters, which were arcaded as was the chapter-house, was destroyed by a fire in 1809; each side, being of late fourteenth or early fifteenth century date, had eight bays with, it is conjectured, a ninth bay beyond; the east side and its Transitional processional door leading into the nave fell into ruins on August 8, 1834; over it was a gallery. The sides measured 15 ft. in width, the cloister-garth being about 100 ft. by 95 ft. To the south lay the refectory, buttery, and kitchen: to the west an outer parlour and, it is believed, the prior's lodgings; to the east the south transept (burned in 1830) latterly the "green churchyard," the chapter-house, and the common room, with dormitory, 120 ft. by 30 ft., above it, through which passes Middlesex-passage to the Little Close. The vaulting of the cloister consists of chalk and rubble in mortar with stone groynes springing from clustered shafts on either side, and with carved bosses at the intersection of the ribs. The groyning, albeit simple, is good masonry, and the preservation of the remains should form a fitting complement to the precedent labours for the reparation of the church which we owe in the first instance to the initiation in 1790-1 of Thomas Hardwick, who examined, and reported upon, the fabric, and whose set of beautiful drawings is preserved in the library of the Society of Antiquaries. The work of restoration was continued from time to time, as the funds allowed, by John Blyth (1837), Richard Carpenter, William Slater, and Professor T. Hayter Lewis (1863), and completed, as our readers will recall, in 1885-97 under Mr. Aston Webb's guidance and supervision with the reinstatement of the choir and apse, transepts, lady-chapel, and crypt.

Portman Market.

This newly-erected market, which was reopened on April 18 of last year for the sale of meat, fish, and vegetables, is again offered for sale. The present buildings, planned

and designed by Mr. H. T. Gunton, of the firm of Messrs. Gordon & Gunton, for Portman Market, Ltd., extend over an area of 43,426 ft. superficial. They comprise 160 stalls divided by eleven diagonal and straight avenues, a space for cold storage, or a garage for motors, beneath the central dome, and twenty-eight shops with a frontage to Church-street, and other main entrances in Salisbury and Carlisle streets. The estimated rental amounts to from 7,000*l.* to 10,000*l.* per annum, and there is a separate installation of electric light. The company had been formed for taking a lease of the site from Lord Portman for fifty-eight years from Lady Day, 1899, at a present ground rent of 1,030*l.* per annum. The vendor, Mr. John Baker, fixed the purchase-price of the lease and market rights at 49,000*l.* The cost of the new buildings, with offices and equipment, was calculated not to exceed 65,000*l.* The market was established on its present site in Church-street, in the parish of St. Marylebone, in pursuance of an Act 11 Geo. IV., cap. 71, additional powers being obtained under an amending Act of 2 and 3 William IV. cap. 113, and stands immediately opposite the goods terminus of the Great Central Railway.

Fine Art Society.

At the Fine Art Society's Gallery is a collection of landscapes in water-colour by Mr. Hugh L. Norris. We should say that Mr. Norris had been somewhat influenced by the style of Mr. J. W. North; his works at least exhibit somewhat the same kind of glitter of light and colour, in which detail is rather suggested than fully made out. The colour in the sky seems in some cases rather heated, but there is a great deal of beauty both of colour and composition in many of the drawings. Among them may be specially mentioned "A New Forest Stream" (14); "All the Air a Solemn Stillness Holds" (33); and "A Field of Poppies" (55). In some of the drawings — "Ibsley Bridge," for instance (50), there is a generally charming effect of colour but the texture of everything seems too much worked down to a conventional surface which does not convey the effect of Nature. However, there is much to like in the collection; among others two flower-garden subjects, "An Autumn Border" and "A Summer Border (25 and 51) are very bright pieces of crowded detail, painted with more incisive touch than the general landscapes. In the same Gallery is a small collection of exceedingly spirited war sketches by Mr. Inglis Sheldon-Williams (late of Compton's Horse, I.Y.), who has served through the war, so to speak, with rifle in one hand and pencil in the other. They are mostly drawings of mounted troopers, sketchy enough (especially the horses), but full of spirit and action.

Architect and Coal Merchant.

An architect sends us an advertisement from a provincial paper asking for tenders for a house, which are to be sent in to a gentleman who defines himself as "architect and coal merchant." This seems a new professional development. It would be interesting to know which occupation came first; is the advertiser a coal merchant who for a special occasion has blossomed into an architect? Or is he an architect who has taken to speculating in the coal trade as a means of adding to his income? At all events, the idea suggests further possibilities of development.

AMENDMENT IN PATENT LAW.

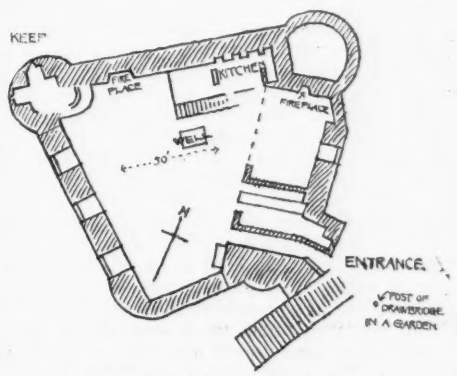
In our issue of May 25, 1901, we adverted to the published Report of a Committee which the Board of Trade had appointed to inquire, within certain limits, into the working of our Patent Acts of 1883-1901. Following upon that inquiry, a Bill was prepared and introduced by Mr. Gerald Balfour, the Attorney-General, and the Solicitor-General during the current Session, and, as amended by the Standing Committee on Trade, &c., was read last week for the third time in the House of Commons. Should the measure be passed by the House of Lords, it will bring about a considerable change in the scope and administration of the existing Patent Act of 1883, and will involve, besides, an increase of the technical staff, which has already assumed large proportions, together with a diminution of the annual surplus derived from fees. To meet in part the losses of revenue due to the expected decrease of income, the Bill prescribes that an additional fee not exceeding 1*l.* shall be payable upon the sealing of the patent.

The principal provisions of the Bill relate to the adoption for the first time in this country of an organised system of inquiry by the authorities into the "novelty" of the claims set forth in applications for the protection of letters patent as soon as the completed specifications are severally deposited by applicants. On and after January 1 of next year the examining and expert staff will be required to supplement the inquiries which they now make in respect of the form, contents, and other particulars of the specifications, with "a further investigation for the purpose of ascertaining whether the invention claimed has been wholly or in part claimed or described in any specification (other than a provisional specification not followed by a complete specification), and deposited in the Patent Office pursuant to any application for a patent made in the United Kingdom within fifty years next before the date of the application." If it should then appear that the invention has been wholly or in part claimed or described in any such specification the applicant is to be informed thereof, and he may within a time to be prescribed amend his specification, and his amended specification will be again investigated and reported upon as before. The Bill declares that an invention shall not be deemed to have been anticipated by reason only of its publication in a specification deposited in the Patent Office pursuant to an application made not less than fifty years before, and excludes publication in a provisional specification of any date not followed up with a complete specification. Thereupon the Comptroller of the Patent Office will notify his acceptance of the specification in the event of his being satisfied that no objection obtains therein upon the ground of precedent anticipation, and in the absence of any other lawful hindrance or ground of objection. But if he is not so satisfied, the Comptroller will accord the inventor a hearing, and, unless the objection is removed by an amendment to his satisfaction, will determine whether a reference to any, and if so, what, prior specifications ought to be made in the specification by way of notice to the public. A right of appeal will lie from the Comptroller's decision to the Law Officer. The new investigations and reports will not be held in any way to guarantee the validity of any patent; moreover, the Board of Trade and their officers are expressly to be exempted from any liability as arising out of such investigation and report. We may here observe that in Germany, Austria, and notably in the United States of America, a search into novelty is undertaken by the Government, and an antici patory claim to the invention, or even its prior publication in a form other than that of letters patent, will operate adversely to the applicant. In France, and, we believe, in Italy and Belgium, no initial examination is instituted in that behalf.

Other clauses of the Bill concern an amendment of the existing law which relates to the grants of compulsory licences by the Board of Trade whereby, in future, that Department will consider any petition addressed to them by an interested person who alleges that the reasonable requirements of the public in the matter of a patented invention have not been satisfied, and prays for the grant of a compulsory licence or, in the alternative, for the revocation of the patent. If the parties do not come to an arrangement between themselves the Board of Trade, should they deem that a prima facie case has been made out, will refer the petition to the Judicial Committee of the Privy Council, but if they are not so satisfied they may dismiss the petition. The Bill declares that the reasonable requirements of the public shall not be deemed to have been satisfied if, by reason of the default of the patentee to work his patent or to manufacture the patented article in the United Kingdom to an adequate extent, or to grant licences on reasonable terms, (1) any existing industry or the establishment of any new industry is unfairly prejudiced, or (2) the demand for the patented article is not reasonably met. The new procedure as to compulsory licences will affect patents granted before as well as after January 1 next, and the Judicial Committee may order the patentee to grant licences on such terms as they may think just, or they may on the other hand revoke the patent if they think that the grant of licences will not meet the reasonable requirements of the public.

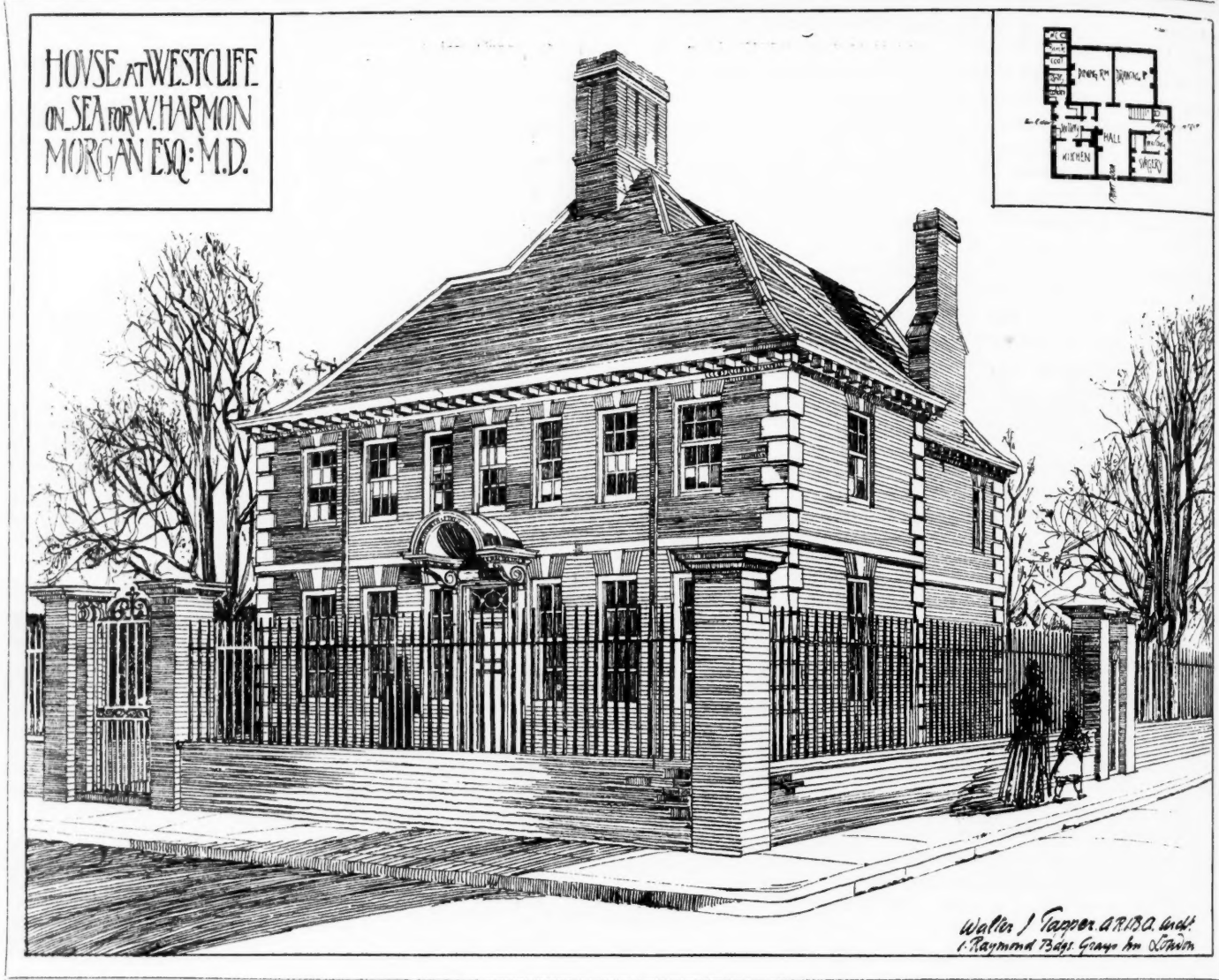
DUNSTAFFNAGE CASTLE, CO. ARGYLL.

At the instance of the Duke of Argyll a subscription list is opened at Coutts's Bank for the proposed reparation of Dunstaffnage Castle, in Lorn, an ancient stronghold of the clan Campbell, and, as is believed, of the Pictish kings, until their overthrow by Kenneth MacAlpine, who carried thence the coronation stone to Scone. Having defeated the MacDougals, Lords of Lorn, in 1305, Robert Bruce laid waste the lands of Argyll, and, as Barbour chronicles, captured Dunstaffnage, which with the mains thereof he bestowed upon Sir Arthur Campbell. In 1436 James I. gave it to Dugald, son of Sir Colin Campbell of Lochawe, in whose descendants, the titular chiefs of Argyll, as hereditary keepers it has since remained. The castle, built in or about 1250, stands upon a promontory at the mouth of Loch Etive; its walls rise sheer up from the steep faces of the rock. The enceinte forms an irregular quadrangle, with its longer diagonal north and south. Two towers, facing the sea at the eastern and western angles, are



Sketch Plan of Dunstaffnage Castle.

rounded on their exterior, but squared to the courtyard. The main entrance is in a projecting bay that faces the east, and the south-west angle is rounded. The north-western tower or keep, measuring about 28 ft. by 25 ft. over all, occupies the highest part of the rock; a stair on its outside rises 6 ft. or 7 ft. to the ground floor, whence a circular stair in the thickness of the wall gives access to the middle floor; the top floor, about 6 ft. wider than the ground floor, is entered from the battlements. The walls have arched recesses internally, and some of the narrow loops retain their original wide splays. The curtain-wall, some 100 ft. long, and from 9 ft. to 11 ft. in thickness, from the keep to the north-east tower, rises to nearly 60 ft. from the base, whilst the parapet walk is not more than 25 ft. above the courtyard. In the angle of the curtain and the north-east tower is a house bearing a date "1725," and letters "Æ C" and "DL C" over the door in the upper floor, which is entered from an exterior stone stair; the house contains the older garde-robes, sinks, and windows of the curtain-wall, and the fireplace; in front lies the well. In the south and squared wall of the adjoining and


HOUSE AT WESTCLIFF ON SEA FOR W. HARMON MORGAN ESQ: M.D.
HALL
KITCHEN
SURGERY
Walter J. Tapper. A.R.I.B.A. Archt.
1 Raymond Bldgs. Gray's Inn. London.

ruined tower is a fireplace ; another large fireplace in the curtain, near the keep, seems to indicate that the great hall occupied the northern side of the court. On the east side the front is 100 ft. in length. The principal entrance is embodied in a four-storied residence ; there are remains of the drawbridge, but an outside staircase against the south-eastern face of the enceinte now gives access to the ground floor. The pointed arch, about 10 ft. in span, of the gateway has been contracted to a narrow, round-arched doorway carried through the wall. A similar pointed arch, 9 ft. wide, at the remoter end of the long passage, has likewise been built up with a lintelled doorway. Two squint shooting-holes lead from the basement floor into the passage, which also has a small guard-room. The southern and western sides of the enceinte, about 68 ft. and 112 ft. long respectively, have mural enclosures in their curtains. The chapel, 160 yards distant south-west, is co-eval with the castle, and is distinguished for a beautiful chancel arch (since built up) with beaded angle-shafts and elaborated mouldings and dog-tooth carving continued on the jambs and arch. The same enrichments will be noticed in some of the high narrow and very widely splayed lancet-windows of the nave ; two pairs have banded shafts 6 ft. 9½ in. high and 5 in. thick, with Early English bases and carved caps. The west window in the south wall is round-headed, without shafts. The chapel, roofless and ivy-grown, 90 ft. 7 in. by 26 ft. 6 in.,* retains its west gable, with angle-shafts in the corners ; the east gable and door are modern. The nave forms a burial-ground for Oban ; the walled-in chancel is reserved for private interments.

WESLEYAN CHURCH, BUCKLESHAM, SUFFOLK.—Memorial stones of a new Wesleyan church were laid at Bucklesham recently. The new building has been designed by Messrs. Eade & Johns, of Ipswich, the contractor being Mr. C. Green, of Ipswich.

* These measurements, and some other structural particulars, we take from Messrs. McGibbon & Ross's book upon the Scottish Baronial and Ecclesiastical Buildings of Scotland.

DOCTOR'S HOUSE, WESTCLIFF.

THE walls of this house are of red brick, and the roof is of red tiles. The hall is panelled, and the floor paved with black and white marble. Messrs. Cross Brothers, Hutton, Essex, are the builders, and Mr. W. J. Tapper, of London, the architect.

THE ST. LOUIS EXHIBITION.

AN Exhibition is to be held at St. Louis, U.S.A., in 1904, to commemorate the centenary of the purchase by Louisiana from the French. The Exhibition was planned for 1903, which is the real centenary (Louisiana having been purchased by the United States Government in April, 1803), but the opening of the Exhibition has been postponed to 1904, we presume in order to gain more time for adequate preparation. Judging from small illustrations which have been forwarded to us, the temporary buildings for the Exhibition will be of a dignified architectural character, though they do not emulate the originality and picturesqueness of those of the Paris and Glasgow Exhibitions.

We extract from a mass of hyperbole in regard to the beauties of the forthcoming Exhibition (in the style which is unfortunately usual in connexion with American enterprises of this kind) the following information :—

The St. Louis Exhibition will spread over two square miles, and include fifteen large buildings for industrial and other purposes, varying in size from 1,300 to 140 ft. long, and from 830 to 200 ft. wide. The Exhibition is planned in the shape of a fan. At the narrow end of the design is the lagoon and cascade. The Festival Hall and the Terrace of States (a screen in classic form fitted with statues allegorical of the different States taking part in the Exhibition) serve as a background. As is the case with nearly all the large buildings, the Palace of the Liberal Arts is being built of "staff," of an old-ivory white colour. The staff is affixed to a framework of timber. Messrs. Barnett, Haynes, & Barnett, St. Louis, are the architects, and the building contract, although the structure is temporary in character, has been let to the Conrad Kellerman Construction Co. for 95,000*l*. Throughout the Exhibition the buildings, as a rule, are Renaissance in style. In the Liberal Arts building, the architects' endeavours have been to conceive a palace of industries, in which the three arts, architecture, sculpture, and painting, join hands. Ornate detail has been avoided, the idea being to depend largely upon sculpture for decorative effect. A semicircular colonnaded vestibule will form the main entrance to the building, with a ceiling decorated with frescoes on a gold ground. The building will have an internal court with a cloister, and decorated with fountains and sculpture ; the walls of the loggias are to be decorated with frescoes.

The "Varied Industries" building is designed by Messrs. Van Brunt & Howe, of Kansas City, and is decorated with an Ionic order. It will present a façade of 1,200 ft. on the north, and 525 ft. on the east, and will have a large tower 400 ft. high, flanked by two smaller towers 200 ft. high, as features of the main façade. The towers are being so constructed as to permit of grand displays of electric light illumination. At the re-entering angle of the south front of the building is a dome 160 ft. in height. Two large open courts are planned in the centre of the building ; these will form, as it were, a miniature village of exhibits. A central passage way, or corridor, runs through the centre of the building from north to south. The contractors for the building are the Rountree Construction Co., St. Louis, their tender for the work being 604,000 dols., or over 120,000*l*. The building is temporary in character, and is being built of staff over a frame of timber.

The Electricity building, of which Messrs. Walker & Kimball are the architects, will be surrounded by water, and will be lit by hundreds of lamps, which will be seen reflected in the water. The Palace of the Fine Arts, because of its more permanent character, will be the most costly of the buildings, and at the close of the Exhibition is to be handed over to the city as a permanent museum building. It is divided into three sections, with a plan of E-shape. The main or central building is of buff brick, whilst the wings, or annexes, are of brick, timber, and staff. The

main building occupies 340 ft. long by 160 ft. wide, and is separated from its two annexes by open courts 44 ft. wide. The cost of construction is set down at about 200,000*l*. The building will stand on a plateau 60 ft. above the other, and be surrounded by a terraced garden. Mr. Cass Gilbert is the architect. A hall, 157 ft. long and 94 ft. wide, is the main chamber in the centre building, and is for sculpture; on either side of this will be picture galleries lighted from skylights. Studios, offices, and workrooms are placed in the second story. In the basement are jury-rooms, packing-rooms, and space for heating apparatus. The annexe buildings, so far as architecture is concerned, follow the style of the main portion, the walls being brick decorated with staff.

We may add that exhibit space is free, and that a limited quantity of power is to be supplied gratuitously for the exhibition of processes of manufactures. The offices for the United Kingdom for the St. Louis Exhibition are at Sanctuary House, Tothill-street, and the resident representative is Mr. George F. Parker.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

THE first meeting of the current session of the Discussion Section of the Architectural Association was held at 56, Great Marlborough-street, W., on the 15th ult., Mr. G. H. Smith in the chair. Mr. Noel F. Barwell read a highly interesting paper on "Some Recent Theories concerning Saxon and Early Norman Architecture in England," in the course of which he summarised the propositions of the leading authorities on pre-Conquest architecture. Dealing first with Professor Baldwin Brown's theory, the author pointed out that all Saxon work could be classified under two broad heads—(1) the Continental type that built under Roman influence, including cruciform buildings, or those of the basilican plan, and (2) those of a Keltic origin derived from the stone oratory, whether with apsidal or square ends. Coming then to the theory advanced by the Rev. W. Myles Barnes, that Saxon work was the production of a guild or body of freemasons, originating from the Comacine guild (a descendant of the Roman "*collegia*"). Mr. Barwell pointed out the weakness of the evidence to support this, the principal item of which was the universal presence of the convoluted ornament known as the Comacine knot. Thirdly, the author took up Mr. E. S. Prior's carefully thought out articles, in which he deals with his subject in a masterly way, through the medium of sculptured ornament. His classification groups Pre-Conquest work into three divisions:—(1) That directly introduced from Byzantium, or with Byzantine influence strongly marked; (2) The Viking school, wherein we see Norse influence most strongly impressed; and (3) the Carlovingian, derived from Italy either through Germany or through Gaul. Having advanced his own conclusions on the preceding theories, Mr. Barwell concluded his paper by showing a large number of interesting lantern slides bearing on the subject.

The discussion was opened by Mr. Louis Ambler, and sustained by Messrs. Watson, Lucas, Ernest Radford, E. W. Hudson, and others, and Mr. Francis Bond (who attended as Special Visitor), in summing up, contributed some interesting and important remarks from his own experience and research. He pointed out the difficulty of classification by plan, because of the extraordinary diversity of even the simplest and earliest buildings; that we at present scarcely realise the high state of civilisation reached by the Romans at the time of the fall of their empire; and, finally, gave an important list of the features most prevalent in pre-Conquest architecture, such as the apse, the triple arch or colonnade between chancel and nave, the transepts, long and short work, midwall shafts, pilaster strips, herring-bone work, circular and triangular arches used alternately. Mr. Bond broadly divided Saxon work into (1) the group which *does not* show the usual characteristics of Anglo-Saxon work (no long and short work, no midwall shafts, and so on), a list of which he gave: (2) That showing a direct knowledge of Norman work, as Sompting and Bradford-on-Avon; and (3) the remaining examples not included in divisions 1 and 2.

The vote of thanks was heartily emphasised, and the Special Visitor specially thanked for his valuable contribution to such a successful discussion.

The next meeting of the section will be held on November 5, at 7.30 p.m., when Mr. H. M. Cautley will give his views on "The Buildings about a Farm."

ARCHITECTURAL SOCIETIES.

ARCHITECTURAL ASSOCIATION OF IRELAND.—The second general meeting of the session took place at the Grosvenor Hotel, Dublin, on Tuesday evening, the 21st ult. The President, Mr. F. G. Hicks, occupied the chair. After the usual routine business had been transacted, Mr. Arnold Mitchell, of London, delivered a lecture entitled "Some Interests of Mediæval Architecture." In the course of the lecture he dealt with the characteristics of the Earlier and Middle Gothic construction and ornament. The buttress and pinnacle were directly the outcome of the arcuated system of construction which was the essence of Gothic work. He described the method by which the builders of old time obtained the effects which they sought—the use of small stones (because they were carried up the scaffolds on men's backs, the time of weight-lifting machinery not yet having arrived), and the making of this compulsory use of small stones a means for good effect, the recessing of arches in thick walls, and consequent beautiful effect of light and shade. The lecturer then went on to point out several instances in which the thoughtfulness of the mediæval builders was very evident—the raising of the bases of columns to the inner arcade in the Triforium at Westminster and elsewhere, and the carving of the round-arched spaces over door heads, where, as occurs in many places, the door proper is covered by the lintel, while there is a semi-circular arch over, projecting beyond this out to the general face of the wall. He drew attention to the great difficulty of designing figure carving in such a way as to fill properly a space like this, and the still greater difficulty of doing so when of necessity a number of horizontal and vertical stone joints crossed the design, and pointed out how successfully these difficulties had been overcome in the instances shown on the screen. It was particularly noticed how the wings and draperies of the figures had been disposed to suit the joints, with the very best effect. The lecturer showed and described many examples of carving to bring out the fact that all the old ornament had its meaning and interest. This was emphasised in the photograph showing a number of heads, forming stops to label mouldings in a nave arcade, where it seemed probable that these heads were likenesses of the various monks who took part in the work of building the church. The lecturer also drew attention to the possibility of obtaining a very rich and beautiful effect by mouldings alone, without the assistance of sculptural decoration; he instanced this by a reference to Salisbury Cathedral, where the only occurrences of carving—as apart from moulding—are in the brackets carrying the ribs of the nave vault. He closed with a reference to the principle which actuated mediæval builders in the later days in their carving—that they did not actually copy natural forms, but used them as a motive and suggestion for their work, and suited the refinement and character of the work to the nature of their material.—Mr. Charles Ashworth proposed a very hearty vote of thanks to the lecturer. He spoke in the highest terms of the lecture, and of Mr. Mitchell's kindness in coming so far to give it. Count Plunkett seconded the motion, and made some remarks as to the surface colour decoration of Gothic interiors.—The next meeting will be held on November 4, when Mr. C. J. M'Carthy (the City Architect) will read a paper on "Three Weeks in Normandy."

COMPETITIONS.

BOARD SCHOOLS, CLACTON-ON-SEA.—Mr. A. W. S. Cross, F.R.I.B.A., the assessor, has reported on the designs for the Holland-road School, received in competition by the Great Clacton School Board. He places the designs in the following order of merit:—(1) "Lux," Mr. T. H. Baker (of Baker & May), Colchester and Clacton-on-Sea; (2) "Crowstone," Messrs. Smee, Mence, & Houchin, 12, West Smithfield, E.C.; (3) "Picturesque," Mr. S. Jackson, 65, Fenchurch-street, E.C.; (4) "Utility with Economy," Messrs. Greenhalgh & Brockbank, Southend; (5) "Compact," Mr. S. J. Adams, Southend; (6) "Experience," Messrs. Scott & Hanson, 10, Basinghall-street, E.C. The Board has adopted the award, and instructed Mr. Baker to proceed with the work. Thirty-one designs were sent in, and the school is for 800 children.

MUNICIPAL BUILDINGS, BIDEFORD.—The first premiated design in the competition for municipal buildings and library, Bideford, was that submitted by Mr. Alfred J. Dunn, 36, Colmore-row, Birmingham. The second premiated design was by Mr. J. E. Forbes, Colmore House, 21, Waterloo-street, Birmingham; and the third by Messrs. Buckland & Farmer, 25A, Paradise-street, Birmingham.

COLONY FOR IMBECILES AND EPILEPTICS, LANGHO.—The Chorlton and Manchester Joint Asylum Committee have just exhibited at the Chorlton Town Hall the designs they have received in connexion with the colony for imbeciles and epileptics proposed to be erected at Langho, near Blackburn. There are thirty-four designs in all, and premiums have been awarded to three:—200*l*. to Messrs. Giles, Gough, & Trollope, architects, 28, Craven-street, Charing Cross, London; 150*l*. to Messrs. Edward Page Howard, Cursitor-street, Chancery-lane, London, and Ernest R. Dolby, architect, Westminster; and 100*l*. to Mr. Joseph Smith, of Messrs. Cheers & Smith, and Messrs. Frederick John Parkinson and Walter Stirrup, joint architects, Richmond-terrace, Blackburn. The designs which gain the first award provide for a total accommodation at first of 706, but provision has been made to extend the accommodation without interfering with the existing buildings to bring up the number of patients to 1,208. There is a central administrative block. To the east there will be homes for males in separate villages, and to the west villages for females and children, the village for sane epileptic children being away from the rest in the south-west corner of the site. There will be a laundry for sane epileptic women, and workshops for sane epileptic men, and the homes of this class of patient will be separated from the homes for imbeciles. Provision has been made for a chapel and a recreation hall, and the architects recommend that the two farmsteads on the site should not be removed, for they might eventually be adapted as a dairy farm, and the homestead of the farm steward and bailiff. The estimated cost is 187,316*l*. The second scheme provided for 698 patients with a view to further accommodation for 504, and the third scheme for 710 patients with extensions for another 500.

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—By permission of the Bridge House Estates Committee the members of this Institution recently paid a visit to the London Bridge Widening Works, and had the opportunity of witnessing the erection of the last girder of the temporary footbridge. The resident engineer, Mr. W. B. Cole, Assoc.M.Inst.C.E., assisted by Mr. Lynton and Mr. Hugh Cruttwell showed the party over. The works are being carried out with the object of widening the footways of London Bridge from the present width of 9 ft. 6 in. to a width of 14 ft. Advantage will be taken of the opportunity of increasing the width of the roadway also from 34 ft. 6 in. to 37 ft. giving an additional 2 ft. 6 in. The existing width between parapets is 53 ft. 6 in., the new width will become 65 ft. The extra width will be carried on granite corbels or cantilevers projecting from the outer spandrel walls of London Bridge, the bed for these corbels being that of the existing dentil course. It is intended to place refuges at intervals over the Bridge, and to light the bridge from standard lights fixed on these refuges. In order to carry out the work it is necessary for the footways to be closed. For the convenience of foot passengers, temporary footbridges are under course of construction on both the east and west sides of London Bridge. Each footbridge consists of five spans of steel work, one span 157 ft. 7 in., and four spans 146 ft. 5 in., which are supported from the piers by steelwork trestles, and at the abutments by timber trestles built up from the stairs leading down to the river, the intervals between the ends of the steelwork and the footway levels at the ends of London Bridge being filled in by timber work. The clear width of the temporary footbridges is about 11 ft. 2 in., and the length from end to end is about 1,006 ft. On the top booms of the

girders and on the top timbers of the timber work a crane road is laid and two electric cranes are mounted on each footbridge. These cranes will be used for dismantling the existing parapet, &c., and setting new stones. The total weight of steelwork is about 750 tons and the new granite will amount to about 50,000 cubic feet. The architect for the work is Mr. Andrew Murray, City Surveyor; the engineer is Mr. E. Cruttwell, M.Inst.C.E.; and the contractors are Messrs. Pethick Bros., of Plymouth, with the Patent Shaft and Axletree Co. as sub-contractors for the steelwork.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Sir J. McDougall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Chelsea Borough Council 12,700*l.* for the purchase of land upon which to build dwellings for the working classes; Finsbury Borough Council 5,475*l.* for paving works; Hammersmith Borough Council 18,150*l.* for electric lighting, street lighting, and meters; Lambeth Borough Council 8,965*l.* for jarrah wood paving works; Stepney Borough Council, 8,010*l.* and 3,530*l.* for paving works, and 675*l.* for street improvements; Chelsea Guardians 1,500*l.* for drainage works at the workhouse; St. Olave's Guardians 2,200*l.* for additions and alterations to the workhouse; and the School Board for London 200,000*l.* for new schools. Sanction was also given to loans to the Lambeth Borough Council for 2,578*l.* and 2,193*l.* for paving works.

Quantity Surveyors.—The General Purposes Committee reported as follows:—

"We have had under consideration the question of quantities for the Council's work being taken out by its own staff, and, in connexion with the subject, we have had before us a memorandum from the Housing Committee expressing the opinion that the preparation by the Architect's staff of bills of quantities for dwellings to be erected for the housing of the working classes would tend to expedition in the Council's housing work. The Council will remember that the principle of allowing quantities to be taken by its own staff is already in operation, the Standing Orders providing that, in the case of small works carried out under the Architect's direction, the Architect shall advise the committees concerned as to whether quantities are to be taken out or not, and that if it is decided to supply quantities they shall be prepared by the Architect's staff. It is further provided that in the case of all works carried out under the direction of the Architect, for which bills of quantities have been prepared, the extras and omissions shall be measured and valued by the measuring surveyors in his department. We think that it would be expedient to allow an extension of the above principle to cover cases of works which, though large, are not of a complicated nature, and we propose, therefore, that the committees concerned should in the case of such works be given a discretionary authority to allow the quantities to be prepared by the Architect. In order to give effect to this, the following amendment of paragraph 1 of Standing Order No. 216 is necessary, the word in brackets indicating a proposed omission from, and the words in italics additions to, the existing Order:—

A quantity surveyor is to be employed by the Council to prepare bills of quantities for [all] complicated or large works, the surveyor employed being responsible in all cases for the accuracy of the quantities, *provided that the committee concerned may in any particular case order the quantities to be prepared by the Architect's staff instead of by an outside quantity surveyor.*

We therefore recommend—'That the following be substituted for the first paragraph of Standing Order No. 216:—

A quantity surveyor is to be employed by the Council to prepare bills of quantities for complicated or large works, the surveyor employed being responsible in all cases for the accuracy of the quantities, provided that the committee concerned may in any particular case order the quantities to be prepared by the Architect's staff instead of by an outside quantity surveyor."

Mr. Cousins moved that the recommendation be referred back. It was a proposal which would seriously affect quantity surveyors and the Council's building work, and from the public point of view the proposed step would be a wrong one. It was desirable that some force should be interposed between the Council's Architect and the builder—some independent person to act as a check. It would be said that the Council had excellent officers and nothing could go wrong; but it was desirable, when dealing with a building owner and the contractor, to employ a surveyor, so that the quantities might be properly taken out. It was desirable to prevent any abuse in the work of the Council; if this recommendation were carried, what a happy family the Works Committee would be, and all things would be arranged in a congenial spirit! An independent check was required.

Mr. Lewis seconded.

Mr. John Burns, M.P., said that for three and a half years, during which the Architect had proved to be an excellent officer, acting under the system by means of which he could recommend either that outside surveyors be employed or his own staff, never had a contractor or builder challenged the Architect or the quantity surveyor on his own staff; but an outside quantity surveyor had been struck off the list because his charges were so excessive. Suppose they had an estate like Millbank suitable for artisans' dwellings, at Camberwell or anywhere else, what right had the Council to engage an outside surveyor and so add to the cost of the scheme, when quantities for the same work, but on another estate, had been taken out either by an outside surveyor, or by the Council's own staff? To engage an outside surveyor would add to the cost in such a case from 3,000*l.* to 4,000*l.*

Sir J. Dickson-Poynder supported the recommendation of the Committee, but said he thought a verbal alteration might be made in it. The Council wanted to avoid duplication of design, and sometimes it was a superfluity to call in an outside surveyor. When new and complicated designs were prepared, however, it was desirable to engage an outside and independent surveyor, for in new work there ought to be a proper check.

Mr. R. Williams said it might be asked, in reply to Mr. Cousins, who was to check the outside quantity surveyor. Mr. Cousins had said that when certain quantity surveyors were engaged on a particular work builders were willing to tender. Was that not because they knew that those surveyors prepared full quantities? It was the duty of every architect to know how to take out his own quantities.

Mr. Phillimore and Mr. Torrance having spoken in favour of the recommendation,

Mr. Howell J. Williams said he thought the Council should hesitate before passing the recommendation. Architects who took out their own quantities were looked upon as black sheep in the profession, and an architect of position never did. [Mr. R. Williams rose to protest, but his remarks were not audible.] He was in favour of some reform, but not the reform proposed. What was wanted was a surveyor's department, and for the responsible surveyor in the employ of the Council to put his name on the back of the quantities, and not the architect who had prepared the plans. The Council carried out an enormous amount of work, and there should be a surveyor's department and their own staff of surveyors.

Lord Monkswell said that it had been stated that when the Council took out their own quantities they could not get contractors to tender. In reply to that, quite recently, eighteen contractors tendered on such quantities.

On the amendment being put, 19 voted for it, and it was declared lost.

The recommendation was then agreed to.

Tramway over Westminster Bridge and along the Embankment.—The Council then discussed the advisability of applying for Parliamentary powers next Session for the construction of a double line of tramways over Westminster Bridge and along the Victoria Embankment, and that portion of the subway authorised by the L.C.C. (Subways and Tramways) Act, 1902, between the Strand and the Embankment.

Mr. Sidney Low said that the tramway was absolutely necessary if the new street from Holborn to the Strand was to be the success they anticipated. They would bring their shallow tramways down from Holborn to the Embankment, and it was important that they should have the trams continued over Westminster Bridge and thus provide a through route from north to south.

Mr. Beachcroft said he was now of opinion that London could not get on unless the tramway systems on either side of the Thames were in some way connected. Personally, he thought that the best way would have been to carry the trams over Waterloo Bridge.

Mr. Allen Baker, Vice-Chairman of the Highways Committee, said that the members of that Committee were unanimous in thinking that if they had failed to make that recommendation to link up the Council's tramways on the north with those on the south, they would have been held up to scorn by the whole of the people of London.

After some further discussion the recommendation was agreed to.

Holborn to Strand: Vaults.—The Improvement Committee recommended, and it was agreed,

"That the estimate of 30,600*l.* submitted by the Finance Committee be approved, and that the Improvements Committee be authorised to arrange where possible for the construction in due course, at an estimated cost of 30,600*l.*, of vaults under the footways of the new street and crescent road included in the Holborn to Strand improvement, and of that portion of Southampton-row which is being widened under the powers conferred by the London County Council (Improvements) Act, 1899."

Tramways.—The Highways Committee recommended as follows:—

"(*a*) That the resolution of the Council of July 29, 1902, to seek powers for the construction of a tramway from Battersea Park-road (South London Tramway Co.'s lines), *via* Battersea Bridge-road, Battersea Bridge, Chelsea Embankment, Chelsea Bridge-road, and Commercial-road, to a point in Buckingham Palace-road, near the Grosvenor Hotel, be rescinded.

(*b*) That the Standing Orders of the Council relative to applications to Parliament for powers be suspended so far as may be necessary, in order that the Council may consider the following recommendations.

(*c*) That application be made in the next Session of Parliament for powers for the construction by the Council of new tramways from Battersea Park-road (South London Tramways Co.'s lines), *via* Battersea Bridge-road, and Battersea Bridge, to a point in Beaufort-street, near King's-road."

The recommendations were agreed to.

Fire Protection of the City.—Replying to Mr Alliston,

Mr. Allen, Chairman of the Fire Brigade Committee, said the Committee had now made arrangements by means of which any call to Watling-street would simultaneously ring up another station. During the last few years they had been improving the fire stations in the City, because they knew that the City was a serious risk, and they were anxious to do all they could for it with appliances and men.

The further consideration of the Report on the Queen Victoria-street fire was adjourned.

Regent's and Grand Junction Canals.—The following recommendations of the Public Health Committee were agreed to:—

"(*a*) That the Regent's and Grand Junction Canal Companies be informed of the unsatisfactory results of the chemist's analyses of samples of water from the canals, and be again urged to pass a large quantity of water from the higher to the lower reaches, so as to change the water in the canals.

(*b*) That the Councils of the Metropolitan Boroughs through which the canals pass be informed of the steps taken and be asked to do all in their power to secure a more sanitary condition of the canals."

Theatres, &c.—On the recommendation of the Theatres and Music Halls Committee the following applications were agreed to:—

Apollo Theatre, Shaftesbury-avenue.—New doorway, &c., submitted by Mr. L. Sharp.

Princess of Wales's Theatre, Kennington.—Heating arrangements, submitted by Messrs. Emley & Sons.

Prior Memorial Hall, S.E.—Various alterations.

Royal Horticultural Society. — New premises, submitted by Mr. E. J. Stubbs.

Royal Victoria Hall, Waterloo Bridge-road.—Alterations, submitted by Mr. E. Hoole.

Shepherd's Bush Empire.—Drainage, submitted by Mr. F. Matcham.

Model Lodging House for Women.—Acting on a resolution passed by the Council over seven years ago, the Housing of the Working Classes Committee have had plans prepared for a women's small model lodging-house to be erected in connexion with the scheme for the clearance of insanitary areas in Webber-row, Wellington-place, and King's Bench-walk, Southwark. This locality, it is thought, affords exceptional advantages for the erection of a small women's lodging-house in connexion with the block of dwellings and shops it is proposed to erect on the area. The lodging-house will be of four stories for fifty-seven women on the cubicle system, with a common dining-room and sitting-room, and will occupy a small portion of the whole area. By managing the lodging-house and dwellings in combination it will be possible to effect considerable economies.

The Architect has also submitted drawings

showing how the remainder of the site may be utilised for five-story block dwellings and shops. The accommodation proposed to be provided is as follows :—

101 two-room tenements.....	202 rooms,
144 three-room tenements ...	432 rooms,
	634 rooms,

accommodating 1,268 persons. There will thus be a total accommodation for 1,325 persons, as against 997 displaced by the scheme. In addition, there would be ten shops and a store for administrative purposes in the rear. The cost is estimated at 79,176*l.* The rent proposed to be charged for the lodging-house is 6d. per night for the single cubicles, and 9d. per night each for the three double cubicles, which will be suitable for a woman and her daughter, or two sisters or friends. The rents of the tenements would average 3s. 1d. per room per week. This, although somewhat high, compares favourably with the rents at the Borough-road dwellings and the Green-street and Gun-street dwellings, which average 3s. 8d. and 3s. 1d. per room per week respectively.

The Report was not considered.

The Theatres Committee and Theatres.—On the Report of the Theatres and Music Halls Committee,

Sir Algernon West, the Chairman, took the opportunity of offering some remarks on recent criticism of the Committee's action in dealing with London theatres. The Council were responsible for public safety in 850 houses, capable of accommodating 400,000 people. They were working under difficulties; on the one side they were attacked as being too rigorous in their exactions, and on the other side they were asked to be stricter. The Council had received the *damnosa hereditas* of theatres wedged and jammed between ordinary dwelling-houses, which were quite unfitted for the purposes for which they were built. If he wanted any proof of the risk from fire that existed in some of those theatres, he might point to the fact that the insurance companies charged very much higher premiums for those houses than for ordinary ones. It was this class of place that the Council was trying to make safer for the public, and he denied that their requirements were excessive. In this matter it was impossible to get finality, but this he could say, that in no theatre constructed under the Council's conditions had the managers been called upon to deal with any requirements which involved any large expenditure. On behalf of the safety of the people, the Council could not swerve an inch to the right or left, and that being secured, they would endeavour to the utmost to secure the co-operation of the theatre managers.

The Report was received.

Tube Railways.—The Parliamentary Committee reported upon the withdrawal of the London United Company's Bill for the construction of a tube railway from Hammersmith to Charing Cross, and upon the general position of the tube question. They recommended that it be referred to the Parliamentary, Highways, and Finance Committees to at once consider the advisability of the Council promoting in the next Session of Parliament a Bill on the subject of underground railways in London.

Mr. Shepherd moved the adoption of the Report. He expressed an opinion that if the Council controlled the tube railways, instead of the companies doing so, there would be no delay in construction as at present, whilst financially there would be a very large saving, because the Council could get money at 3¼ per cent., and the companies had to pay 6⅓ per cent. That meant a saving of 200,000*l.* on each 10,000,000*l.* invested, and as it was estimated that the total cost of these railways in London would be 50,000,000*l.*, it could easily be seen how large the total saving would be.

Mr. Sidney Low moved an amendment to add the words "and to further consider the advisability of urging his Majesty's Government to appoint a Royal Commission or Select Committee to consider the whole question of London underground locomotion."

Mr. Phillimore seconded the amendment, and expressed the hope that the inquiry would not be confined to tube railways, but would also include shallow tramways.

Mr. Cornwall pointed out that between 1884 and 1901 twelve Acts were passed authorising the construction of tube railways, and in the cases of seven of them no work at all had been executed. In 1901 eleven new Bills were introduced, and not a single one was passed; and in 1902 thirty-three Bills were introduced, and practically none of them had been agreed to. This was a serious state of affairs for London, and he thought they should call upon the Board of Trade to adopt the opinion of both Houses of Parliament, that these Bills should be dealt with by a special tribunal.

After some further discussion, the amendment was rejected by a show of hands.

Mr. Dew suggested that the Housing of the Working Classes Committee should be included in the reference, and this being agreed to, the Committee's recommendation was amended accordingly.

The Council then divided on the amended recommendation, when the numbers were :—For, 70; against, 13.

The recommendation was therefore carried.

Other business was disposed of, and the Council adjourned.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses :—

Dwelling-houses on Low-lying Land.

Poplar.—(*a*) That the resolution granting a licence under Section 122 of the Act, for the erection of fifty-two houses on low-lying land situated at British-street and Cahir-street, Millwall, be rescinded. (*b*) That the solicitor do prepare a licence to Messrs. W. G. Wells & T. B. Benton, for the erection of fifty-five houses on low-lying land situated at British-street and Cahir-street, Millwall (Mr. W. Clarkson).—Consent.

Greenwich.—(*a*) That the resolution with reference to the formation or laying out of a new street for carriage traffic, to lead from Toddman's-lane to Woodlands Park-road, Greenwich, and in connexion therewith the widening of a portion of Toddman's-lane and Woodland-place, be rescinded. (*b*) That an order be issued to Mr. L. Sandilands sanctioning the formation or laying out of a new street, for carriage traffic, to lead from Toddman's-lane to Woodlands Park-road, Greenwich, and in connexion therewith the widening of a portion of Toddman's lane and Woodland-place (for Mr. D. G. Horlock).—Consent.

Lines of Frontage and Projections.

Lewisham.—Projecting balconies over the entrances to forty-two dwelling-houses on the west side of Stondon Park, Lewisham (Mr. E. Tompkins).—Consent.

Marylebone, West.—A porch at the entrance to No. 42, Portman-square, St. Marylebone (Mr. E. Hoole for the Earl of Northbrook).—Consent.

Bermondsey.—A one-story shop on part of the forecourt of No. 134, Long-lane, Bermondsey (Mr. S. Kipps for Mr. H. Thomas).—Refused.

Marylebone, East.—A balcony at the first-floor level in front of No. 6, Duchess-street, Portland-place, St. Marylebone (Mr. W. H. White for Mr. R. H. Tebb).—Refused.

Westminster.—A portico in front of Block 1, Rutland-court, High-road, Knightsbridge (Mr. D. Joseph for Mr. H. Lovatt).—Refused.

Width of Way.

Limehouse.—One-story building on the west side of Glamis-road and north side of Hunt's-mews, Shadwell, with the external walls of such building at less than the prescribed distance from the centre of the roadway of Hunt's-mews (Messrs. Waterman & Abrahams for Messrs. Meredith & Drew.—Consent.

Width of Way, Lines of Frontage, and Projections.

Southwark, West.—Two-story bay windows in front of four houses on the site of Nos. 7, 9, 11, and 13, Hayles-street, St. George's-road, Southwark (Messrs. Waring & Nicholson for the trustees of the Hayles Charity estate).—Consent.

Wandsworth.—The rebuilding of the Horse and Groom beerhouse, Mitcham-road, Tooting, and the erection of a sign to project therefrom (Messrs. Chart, Son, & Reading for the Tooting Brewery, Ltd.).—Consent.

Lines of Frontage and Construction.

Clapham.—An additional story on the flat roof of the existing porch in front of Branscombe, Queen's-road, Clapham (Messrs. G. Candler & Sons for Mr. T. Hancock).—Consent.

Poplar.—Deviation from the plans approved by the Council for the erection of an overhead transporter across East Ferry-road, Poplar, so far as relates to the omission of the iron roof over such transporter (Mr. F. E. Duckham).—Consent.

Wandsworth.†—A wood and glass addition on the projecting landing at the rear of Blandfield, Nightingale-lane, Wandsworth, to abut upon Blandfield-street (Mr. L. S. Rogers for Mr. J. Heard).—Refused.

Width of Way and Space at Rear.

Hampstead.—That the application of Mr. H. Marnham for an extension of the period within which the erection of residential flats on the west side of Grove-place and the south side of Christchurch-road, Hampstead, was required to be completed, be granted.—Agreed.

Width of Way and Deviation from Certified Plans.

Hackney, North.—Certain deviations from the plan certified by the District Surveyor, under Sections 13 and 43 of the Act, so far as relates to the proposed rebuilding of the Beehive beer-house, Retreat-place, Upper Clapton (Mr. G. W. King for Messrs. Whitbread & Co., Ltd.).—Consent.

Formation of Streets.

Lewisham.—That an order be issued to Mr. R. Stewart refusing to sanction the formation or laying out of new streets for carriage traffic on part of the St. Germans estate, Hither Green, Lewisham, westward of Torridon-road, and southward of Braidwood-road (for Mr. A. Cameron Corbett, M.P.)—Agreed.

Cubical Extent.

Fulham.—A building on a site on the east side of Townmead-road, Fulham, and abutting on the river Thames, with four divisions of a one-story portion of such building each to exceed in extent 250,000 cubic feet but not 450,000 cubic feet, and to be used only for the purposes of a biscuit manufactory (Mr. W. T. Hanman for Messrs. Macfarlane, Lang & Co.).—Consent.

Dwelling-houses on Low-lying Land.

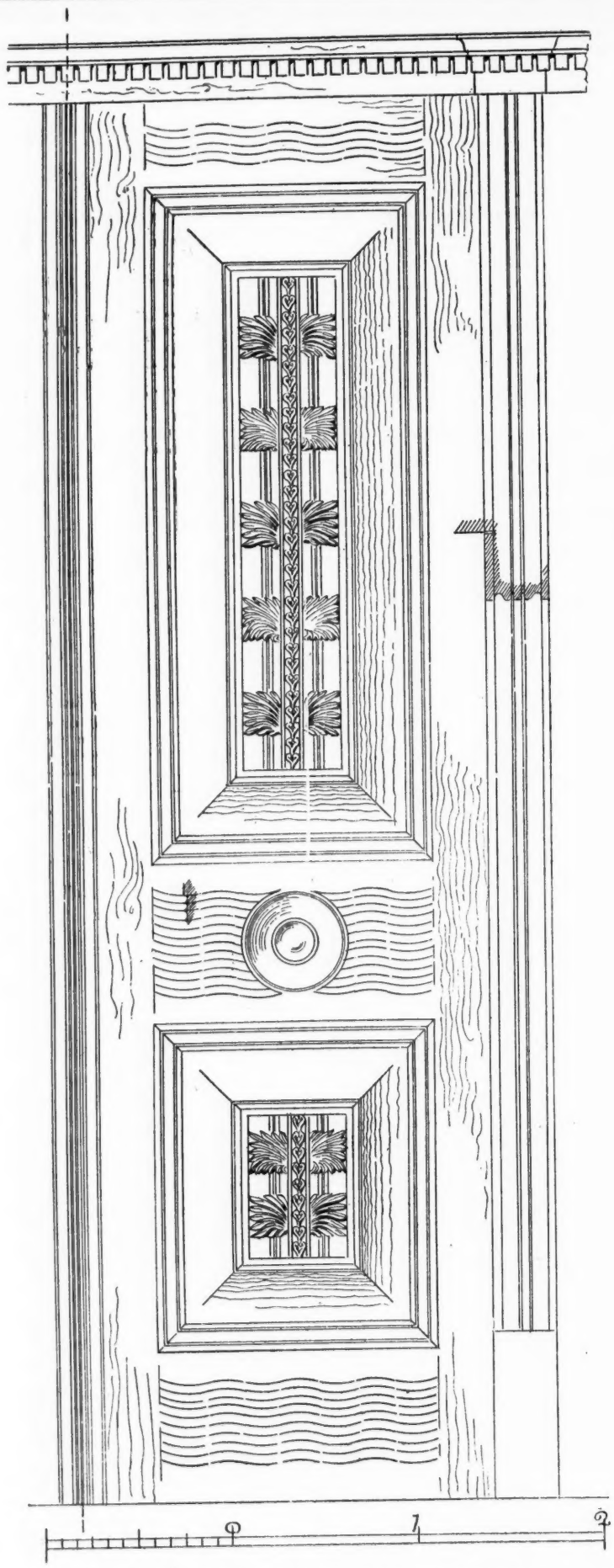
Woolwich. — That the solicitor do prepare a licence under Section 122 of the Act, to Mr. A. Sales, for the erection of twenty-eight buildings on low-lying land at Griffin Manor-way, Plumstead (for Mr. A. B. Hills).—Consent.

*** *The recommendation marked † is contrary to the views of the Local Authority.*

"DIRECTORY OF THE BUILDING TRADES."

THE "Directory of the Building Trades, 1902," which has just been issued by Kelly's Directories, Ltd., High Holborn, is the ninth edition of a well-arranged and carefully edited work. According to the title page, it comprises "every trade and profession in any way connected with architecture and building throughout England, Scotland, and Wales, and the principal towns in Ireland, the Channel Islands, and the Isle of Man." We have had in frequent use previous editions of the work, and we can vouch for the accuracy of the information it contains—information which is easy to find, as the directory is so admirably arranged. There are 2,509 pages in the work, exclusive of advertisements, compared with 2,314 in the last edition, and the price is 1*l.* 10s. In the preface to the directory we read that the amount of timber, mostly used in building, which was imported into this country during the year 1900 was as follows :—Hewn : Fir, 2,787,945 loads (4,299,518*l.*); oak, 173,800 loads (1,018,829*l.*); teak, 63,080 loads (786,066*l.*); unenumerated, 96,323 loads (358,312*l.*) Sawn : Fir, 6,401,636 loads (17,856,360*l*); unenumerated, 231,074 loads (829,999*l.*). House frames, fittings, joiners' and cabinet work (1,195,314*l.*). These figures, compared with the totals for the year 1898, show a considerable increase in every description of timber imported, especially in fir timber. The totals are exclusive of mahogany and hardwood, 192,134 tons, of the value of 1,177,459*l.*, and of lead (pig and sheet), 195,380 tons, of the value of 3,321,574*l.* It must be remembered also that the above figures are independent of the home productions, such as ash, elm, oak, birch, &c., of which there are no records, but which amount to something considerable. In addition to the above, there was imported into this country from abroad stone, marble, and slate to the total of 946,040 tons, of the declared value of 1,132,851*l.*, the principal item of which consisted of 344,054 tons imported from the Channel Islands, of the declared value of 196,631*l.* The above items show an increase of 472,122*l.* over the figures of 1898.

The exports of articles used in building are also considerable; among the most important may be mentioned the following :—Cement, 359,944 tons, value 673,162*l.*; lead—rolled sheet, &c., 18,510 tons, value 382,496*l.*;



Elevation of Front Door, Standard, and Transom.

painters' colours, value 2,053,945*l.*; slates, 23,740,600 tale, value 147,800*l.*

There are no published accounts showing the amount of stone quarried in this country, but the total estimated value of stone of all kinds raised is between seven and eight millions, and of slate and slate slabs, produced under the Metalliferous Mines Act and under the Quarries Act, amounted to 585,859 tons, of the value of 1,528,336*l.*

In the present edition the publishers have included the names in the principal towns in the Channel Islands.

Illustrations.

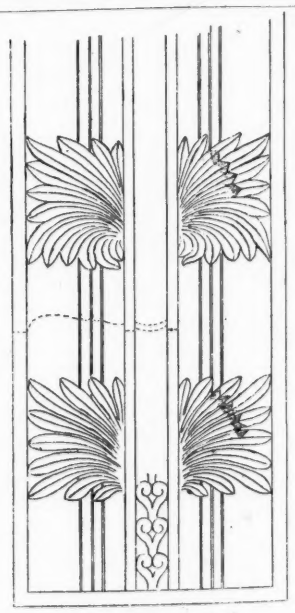
New Front, *Builder* Office.

The owners of the *Builder* premises have been compelled to set the front of the buildings 3 ft. 6 in. back, in order to conform to the new street line for the east side of Catherine-street. It was not thought worth while to put up again the materials of the old front, and as the materials must be new, the opportunity was taken to erect a new design.

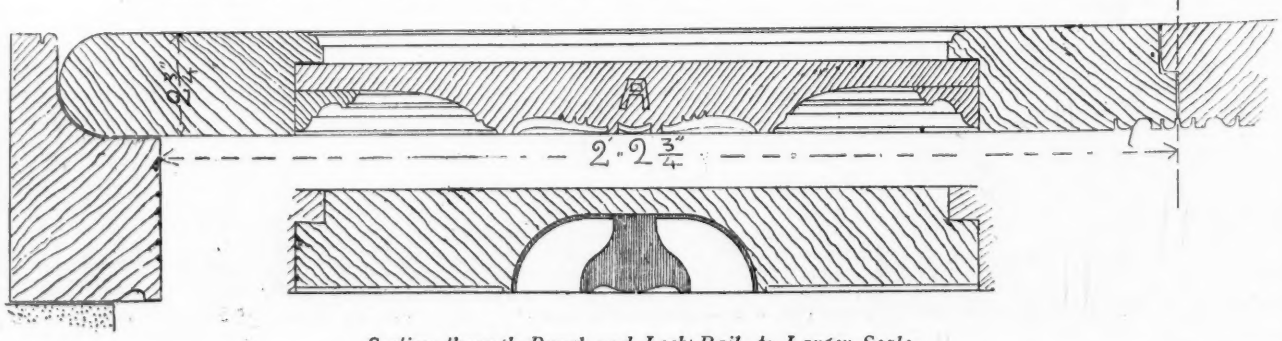
As the offices of the *Builder* consist of a high and narrow building which at present is standing isolated with no support on either side, there was a certain degree of risk in removing the cross wall in front; and the first thing I had done was to place balks of timber across from wall to wall at each floor, over each other, at about 3 ft. back from the ultimate front line, and shore the walls outside at the same point, so that they were gripped between the two. This being done, the operation of taking down the old front wall and building the new one was carried out without any injury to the building or any interruption to the office work.

An entirely stone front was too costly, so that I had to endeavour to get a certain degree of effect with a front largely constructed in plain brick. The bricks are Bracknell red, of medium colour; the stone, selected white Portland. The front doors and woodwork of the ground story are in wainscot oak; it was intended to use English oak, but it is curious to record that it was impossible in all London to get English oak, at the moment, in sizes sufficient for the purpose; and as the work had to be carried out by a certain date, the English oak had to be abandoned, though some fairly fine wood was obtained in lieu of it.

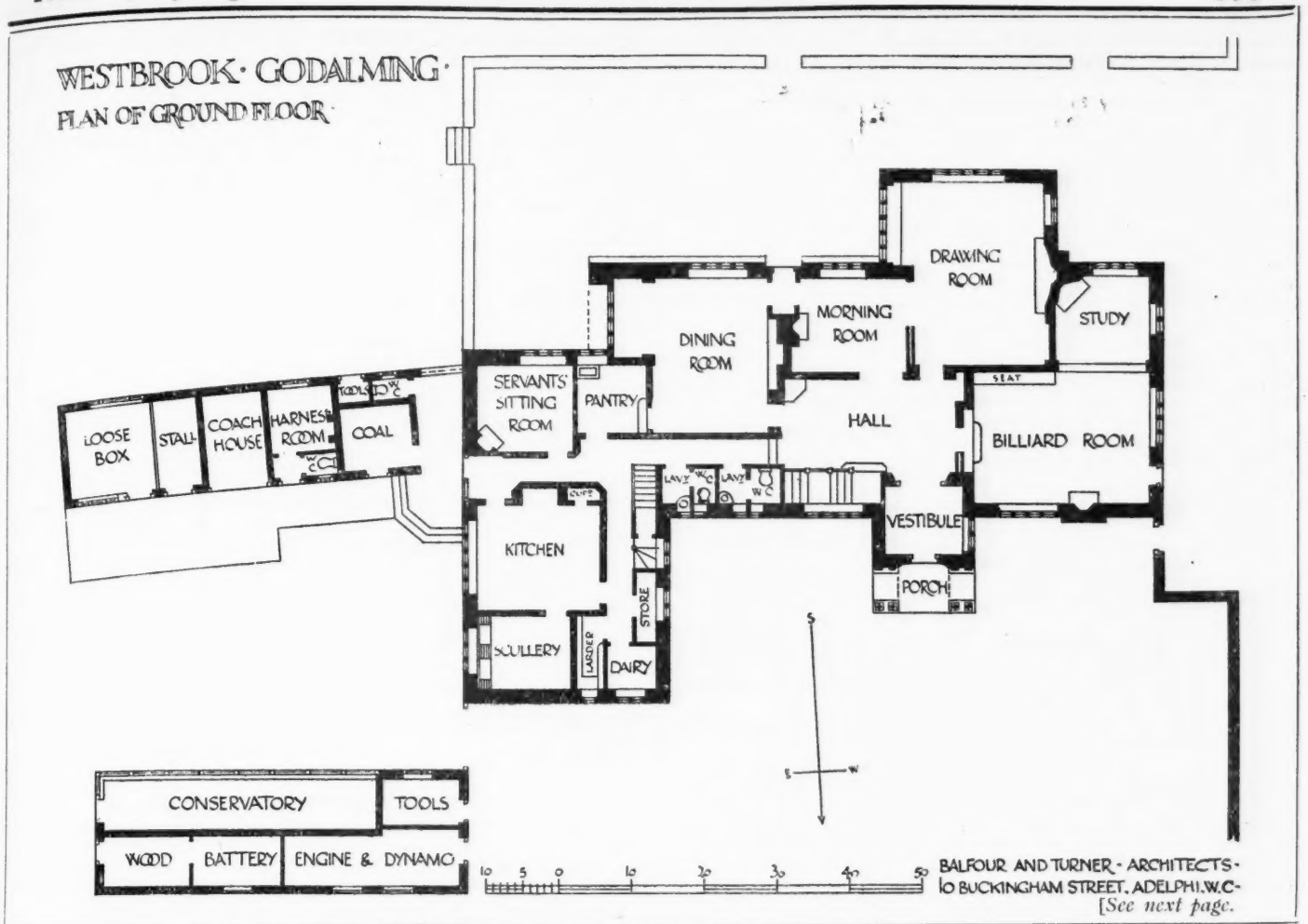
The attempt has been made to give some



Enrichment at A.

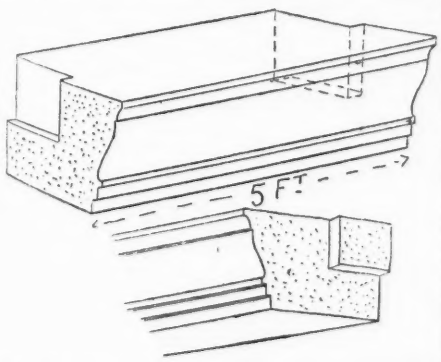


Section through Panel and Lock Rail, to Larger Scale.



[See next page.

originality of character to the stone details, the principal of which are shown in the sheet of details, which is inserted also partly as representing the kind of illustration of a building which we should be glad to have more often if we could get it. An elevation, with details to a tolerably large scale, is a much more valuable form of illustration for an architectural paper than a perspective drawing with no details. The profile of the main cornice, of slight projection in comparison with its depth, was dictated by the desire to have a fairly rich cornice, but to keep its return within the centre line of the party-wall, so that it should not be interfered with by any adjacent building. The carving (executed by Messrs. Daymond) is worked entirely by being sunk from the main profile of the stone, as shown on the section, so as to keep the profile line untouched. The arch on the ground story is an honest working arch, but the inner thickness of the wall, within the window-plane, is taken by a girder. The support of the centre part of the bay, which projects nearly to the edge of the ground-floor cornice, is arranged for in the setting of the stone, a five-feet length of stone in the centre of the cornice having a joggle cut at each end, as shown on sketch, on which projections in



the adjoining stones (which are well weighted) bear; thus avoiding any dependence on iron ties. The stone balls on the attic and finial are gilt, and therefore have a brightening effect not seen on the lithograph, as gilding always reproduces dark. It is surprising that gilding is not more used in this kind of way in London buildings; it produces an excellent effect and lasts very well: of course it must be used with reserve. The ornamental grille under the ground floor window is not a vain show; it is inserted to mask the louvres which were necessary for ventilating the store-cellar in the basement, and which would have had an unsightly appearance if prominently seen.

An elevation and details of the entrance-doors are appended; they are folding doors in 2¾-in. oak, and form rather a fine piece of joiner's work. The handles are of white metal, sunk in recesses lined with the same material.

Messrs. Colls & Sons were the general contractors for the work. The glazing was all done by the Luxfer Prism Companies. The ground floor window is glazed with their prism glass in order to throw as much light as possible into the office. The Luxfer Companies have also been most successful in getting light into the basement, by means of a prism light in the pavement and one of their hanging screens inside, which diverts the light received from the pavement light into a horizontal light reacting far into the interior. In the upper windows the small quarries of glass are set in the Luxfer Companies' patent electro-glazing, which has been fully described in these columns, and which, while promising to be more durable than ordinary leading, certainly obstructs less light and has a very neat appearance. The gun-metal lettering on the front, and the letter-box front and other bits of decorative metal work, were carried out by Mr. Geo. Wragge. The mosaic pavement in the small vestibule is by the Rust Vitreous Mosaic Co. The whole of the details of every kind were made from the architect's full-size drawings.

H. H. STATHAM.

COMPETITION DESIGNS FOR DEPTFORD MUNICIPAL BUILDINGS.

WE give in this number illustrations of the first premiated design in the Deptford Municipal Buildings, by Messrs. Lanchester, Stewart, and Rickards; and the second premiated design, by Messrs. S. B. Russell and C. E. Mallows.

The authors of the first premiated design send us the following quotation from their Report, as sufficiently explanatory of their intentions:—

"The design is in the traditional style of the seventeenth and eighteenth century buildings of the riverside towns, such as Greenwich, Gravesend, and Rochester, where many beautiful examples of work of that period remain. The nautical associations of Deptford are expressed in all the sculptured ornament of the design, on the façade are six bas-reliefs representing admirals, who may have been connected with the town, and other sculpture and decoration illustrates its annals and naval record. The principal feature of the design internally is the arrangement of all rooms round a central hall containing a marble staircase with arcaded galleries on either side; this hall is lit from a dome, and its position makes the lines of communication between the rooms convenient and direct. The ground floor is devoted to the principal offices, while the first floor contains the Council-chamber, committee-rooms, &c., arranged to form one spacious suite; additional accommodation being placed in the basement and on a mezzanine floor."

SECOND PREMIATED DESIGN.

In regard to their design Messrs. Russell & Mallows write as follows:—

"In this scheme the building is practically divided into a front and rear block, with a large area between for light and through ventilation.

Communication between the blocks is afforded by the principal staircase, which is arranged to take advantage of the natural fall of the site to the front.

By this means the floors of the rear block are raised from 5 ft. to 6 ft. above the floors of the front block, and efficient lighting is not only secured to all the rooms on the ground floor, with the window-sills at the usual height, but also to those rooms in the basement designed as spare offices.

The plan is laid on simple and direct lines, and is well lighted in all its parts.

All the offices to which access is required are entered from the front and rear halls on the ground floor, with the exception of the Borough Surveyor's department, which is on the first floor and is north lighted. Three good spare offices are provided in the basement.

The Council-chamber, ante-room, cloakroom, &c., are placed in the rear block on the first floor level, in a position retired from all external noise, with the Mayor's parlour, members' and committee rooms, &c., half a floor higher up on the front block.

The whole of the Council suite is detached from that part of the building frequented by the public, and in its position on the upper floors the loftiness necessary for its apartments can be procured without detriment to

other parts of the building. Easy access for Councillors can be obtained by the lift in the staircase hall.

The public gallery to the Council-chamber is entered by a staircase which communicates directly with the street as required by the instructions.

This stair provides also for private access to the caretaker's quarters.

Ample, well-lighted, and ventilated lavatory accommodation is provided on each floor, and two sets are arranged in connexion with the Council suite, so that in cases of receptions, &c., one may be set apart for the use of ladies.

The contents of the building, carefully measured, amount to 455,861 cubic ft.—say 456,000, which allows approximately a sum of 16d. per cubic foot to erect the buildings for the sum of 30,000*l*.

From experience of the cost of similar buildings this rate is considered ample.

Mr. Belcher, in his published award, remarks on this design as follows :—

'The design I have placed second is of an unusual character, and of a type differing considerably from any other in the competition. The lighting of every part has been successfully managed by the introduction of a large internal area carried down to the basement.

The required accommodation has been obtained by the insertion of an extra floor in the front block. These floors are connected by half flights of stairs with those of the rear block, the required areas being thus obtained in every instance with ample lavatory accommodation.

The arrangement of the committee-rooms in conjunction with the Council-chamber is less satisfactory, and does not lend itself well for receptions and public ceremonies.

The elevations are quiet in character, and suitable for their purpose.' "

"WESTBROOK," GODALMING.

This house was built under favourable conditions, as Bargate stone for the walling stone was excavated on the site. The custom in the neighbourhood is to break it up into small cubes, but in this case it was used very much in the sizes it came out of the pit. Doulting stone was used for the dressings, and the walls were lined inside with brick.

The windows have gun metal casements throughout, and are glazed with Crown glass, all of which have been provided by Messrs. Hope, of Birmingham.

The roofs are covered with old hand-made plain tiles, and the eaves are formed with thin slabs of Bargate stone, which are held in place by the weight of the roof resting on the wall plates. The staircase and panelling in the hall are of English oak, and were executed by Mr. Luxford, of Forest Row.

The main work, including laying out the garden, was carried out by Messrs. W. Holt & Sons, of Croydon ; all the electric light work being done by Messrs. W. A. S. Benson & Co., of Bond-street.

The architects are Messrs. Balfour & Turner.

Books.

The Works in Architecture of Robert and James Adam. Facsimile Reprint, complete. London : E. Thézard. 1902.

MR. THEZARD has now completed his splendid reprint of the "Works in Architecture" by James and Robert Adam, to the issue of the earlier parts of which we drew attention when they first appeared. The two concluding parts, 9 and 10, constitute vol. iii. of the original work, which is the most scarce of all, even the library of the Institute of Architects, we believe, possessing no copy of the original volume.

Part 10 contains three very interesting and fine illustrations of a pavilion erected for the Earl of Derby at The Oaks, Surrey, for a great *fête champêtre* held there on June 9, 1771, which must have been an entertainment of truly royal magnificence. The plan shows a ballroom 72 ft. by 33 ft. within the columns, 86 ft. by 56 ft. within the walls, the oblong portion of it being lined with a colonnade, while at one end there is a semicircle of coupled columns. Outside of and concentric with this, and extending also outside the straight portion of the ballroom, is a vast supper saloon forming a kind of aisle round the whole. Besides this, there are tea-rooms at each end of the supper saloon, and an octagonal vestibule 30 ft. wide giving access to the ballroom. Then we have a large view of the ballroom taken from outside the semicircular colonnade, and a view of the interior of part of the supper saloon ; both crowded with figures. The whole interior is carried out and decorated with the most profuse decoration of the kind so familiar to us in the work of the Adams, with a profusion of columns (Corinthian order). It must have presented a splendid spectacle, and it would be interesting to know in what materials this magnificent temporary Temple of Pleasure was carried out. Among the other contents of the third volume are the elevation of the Admiralty screen ; the view of the interior of the library at Sion House ; a view of the river front of the Adelphi as existing before the Thames Embankment was made ; and the plan and two elevations of the buildings for the University of Edinburgh.

There is no occasion here to consider afresh the merits and demerits of the style which Robert Adam may be said to have created ; it is familiar to all, and was seldom more appreciated than at present—perhaps a little over-appreciated ; but it has a remarkable quality of grace and refinement, and it must be added that Adam's best buildings are better in their actual effect than in the highly finished but hard and mechanical drawings in which he had them illustrated.

His book, however, is a monumental one, without which no architectural library can be said to be complete ; it contains illustrations of some notable buildings and decorative structures which have been demolished and are only recorded in these plates ; and the whole work is a remarkable monument to an architect who rose in his time to a great position solely by his own talents and high character. Mr. Thézard's reprint, in which the French and English text are retained and the old fount of type imitated, is, except in commercial value, almost as good a possession as the original work, and we have no doubt that many architects will be glad thus to be able to secure a publication which is now hardly to be had in its original imprint.

Trades Waste : Its Treatment and Utilisation, with Special Reference to the Prevention of Rivers Pollution. By W. Naylor, F.C.S., A.M.Inst.C.E., Chief Inspector of Rivers, Ribble Joint Committee, &c. London : Charles Griffin & Co., Ltd., Exeter-street, Strand. 1902.

In the preface Mr. Naylor limits the scope of this work to "the causes of rivers pollution, and also the best-known practical means of preventing such pollution economically." The utilisation of trades waste is only discussed incidentally. Engineers have for a long time desired a full and authoritative treatise on the purification of the waste waters from manufactories of different kinds, and Mr. Naylor's work can be recommended as an able statement of the best modern practice in this important branch of sanitary engineering. The first chapter is introductory, the most interesting paragraphs being those relating to standards of purity. The author states that the only way out of the present difficulty in respect of river pollution is "the adoption of a standard," and adds that "a standard has got to come." On a later page, however, he thinks it "questionable whether a uniform standard could be applied to all trades." Chapter II. is entitled "Chemical Engineering," and gives formulas for the rate of subsidence of solid particles, the strength of tank walls, &c., and details of different forms of precipitation-tanks, pumps, filters and other apparatus. The following six chapters treat of the wastes from woollen manufacture, tanning and fellmongery, brewing and distilling, calico-bleaching and dyeing, calico-printing and dyeing, and paper-making, and there is a final chapter on "General Chemical Waste." In the Table of Contents, Chapter III. is entitled "Woollen Mill Waste," but the title given in the body of the work—namely, "Wool Degreasing and Grease Recovery"—is more appropriate. The waste waters from the processes of tanning and fellmongery are less difficult to purify, as the solid matters are amenable to bacterial treatment, and the chapter on these processes is in the main an account of the modern methods of tank treatment and subsequent filtration. Brewery wastes can also be purified in a similar way, but as they become "sour," it is necessary to neutralise the acid in some way, and the author describes his method of effecting this by means of sewage or sewage-sludge introduced into the tanks. The same method has been adopted by Mr. Naylor for the waste waters from calico-bleaching works.

It is unnecessary to refer in detail to the treatment of the waste waters from all the other trade processes described by Mr. Naylor. We need only say that the book is packed with useful information and is well illustrated by means of about twenty photographic views of actual installations, twenty-seven folding diagrams (chiefly drawn to scale), and over a hundred illustrations in the text.

The Elements of Electrical Engineering. By T. Sewell, A.I.E.E. London : Crosby Lockwood & Son. 1902.

This book goes over the ground usually covered in a first year's course of electrical engineering. The descriptions of most of the fundamental phenomena which form the basis of modern engineering practice are clear and concise, and some of the instruments in every day use by electricians are well described. The author has carefully avoided treating any problem on orthodox mathematical lines, but he manages by means of arithmetic and very elementary algebra to give a very fair conception of the methods employed in electrical calculations. In some places, however, the straining after simplicity has led to vague statements which would puzzle the beginner more than a fuller mathematical statement. For example, on page 69 an argument is summed up as follows :—"Therefore, the magnetic potential of the coil is one and a quarter times the ampere turns." The beginner, if he tries to understand this at all, would soon be led to the most erroneous notions about magnetic potential. Again, on the same page, no distinction is made between lines of magnetic induction and lines of magnetic force. It is true that magnetic potential and magnetomotive force, flux of lines of force and flux of induction, are often used indiscriminately by engineers, but this is surely all the more reason why beginners should be taught accurately.

Again, the definitions in several places are given so inaccurately that it would have been better to omit them altogether. "The gramme is the unit of weight." "It is the weight of water at 0°C, which will just fill a cube of one centimetre side." Now the gramme is the unit of mass, and the mass of a body is a constant and independent of its position on the earth's surface, but the weight of a body is less at the Equator than at the Poles. The mass of the riders for use with a Kelvin balance is constant, but their weight is calculated from a formula depending on the latitude of the place and its height above sea-level. Again, the gramme was originally defined as the mass of a cubic centimetre of distilled water at 4°C, not at 0°C. A sentence on p. 14 shows how important it is to distinguish between mass and weight. "At sea level the gram exerts a force of 981 dynes, or a gram acting on another gram for one second would impart to it a velocity of 981 cm. per second." The only action of a gramme on a gramme is the attraction produced by the Newtonian gravitation between them, and is exceedingly minute.

In the chapter on indicating instruments no mention is made of the Kelvin ampere balances, which are the most important of all ammeters. In the chapter on meters Mr. Sewell gives a good description of the Aron Watt-hour meter, but it is sadly discounted by the diagrams being apparently made from worn-out blocks. The principle of the arc lamp is well explained, and the working parts of several kinds of lamps are clearly described. Some very curious curves, taken from the results of tests made on enclosed arc lamps by the National Electric Light Association Committee of America, are given. It would be interesting to know how far these curves represent actual phenomena, and how far they are due to the unavoidable experimental errors inseparable from the photometric methods employed. It is stated that the light is given in "Hefner" units, and that if we wish to convert it to English candle-power we must divide them by 0·875. According to this the "Hefner" would equal 1·14 English candles. On p. 249,

Mr. Sewell gives the "Hefner" as equal to 0·875 of an English candle, and this is the value we have been accustomed to take, although some English glow-lamp manufacturers issue standards which make the English candle less than the "Hefner."

The space devoted to the description of the Evershed ohmmeter and generator is inadequate. The principle of this instrument can be very clearly explained to beginners by means of a diagram, and it is an instrument in such general use that every electrician should understand how it acts. It would also have been well to explain the difference between the insulation resistance between the mains and the insulation resistance of the mains to earth. It would startle the beginner after reading this book to find that this last resistance was the only one measured by central station engineers.

The Painter's Laboratory Guide: a Handbook on Paints, Colours, and Varnishes for Students. By GEORGE H. HURST, F.C.S. London: Charles Griffin & Co. 1902.

THE work of the builder daily becomes more closely linked with that of the chemist. This book is essentially a book for the student who has passed through the usual chemical courses of a modern technical school. To the average architect, builder, or painter of an older school it will be of comparatively little value.

The book is especially intended to meet the requirements of students attending practical courses on colours, oils, and varnishes, at a technical institute; but all who have a laboratory and an elementary knowledge of chemistry will find it a useful guide to the methods by which the quality of oils, paints, and pigments may be tested, and adulterants, if present, be estimated.

The chapter dealing with coal-tar colour lakes will, however, tend to alarm even the modern student unless he has previously studied the chemical constitution of organic colouring matters. Chemists are fast approaching the ridiculous in their efforts to indicate the constitution of organic bodies by their nomenclature. Thus the following are mentioned on page 150 as the names of four well-known dyestuffs:—

Benzene-azo-beta-naphthol-disulphonic acid.
Toluene-azo-beta-naphthol-disulphonic acid.
Xylene-azo-beta-naphthol-disulphonic acid.
Cumine-azo-beta-naphthol-disulphonic acid.

And on page 152 we are told that Meldola's blue is the chloride of dimethyl-phenyl-ammonium-beta-naphthoxamine, while Nile blue is "of a more complex composition." Fortunately, commerce speedily discovers short substitutes for these lengthy appellations.

The greater portion of the book will, nevertheless, be readily understood by all students who have passed through what is commonly termed a "first year's course" in chemistry. The number of those connected with the building profession who receive tuition in chemistry is rapidly increasing, and to such students we can cordially recommend Mr. Hurst's handbook.

The Acts Relating to the Supply of Gas and Water by Companies and Local Authorities. With Reference, Notes, and Index. Compiled by JOSEPH REESON. London: Butterworth & Co. 1902.

THE increase in the number of companies and local authorities who are concerned with the supply of gas and water, renders this compilation timely and useful. It is brought down to the end of August last, and may be commended to the notice of those who have to do with the subject of which it treats. Pretending to be no more than a collection of Acts which treat of two subjects, it requires no detailed notice. That the work will be useful we cannot doubt.

The "Mechanical World" Pocket Diary and Year Book for 1903. Manchester: Emmott & Co., Ltd.

THE greater part of this book is devoted to engineering notes, rules, and tables, the diary being quite a subsidiary feature. Most of the data given relate to mechanical engineering, but there are useful sections on beams and girders and on the electrical transmission of power. Many new tables have been added in this issue, and the tables of logarithms have been set in larger type.

TRADE CATALOGUES.

MR. J. STANNAH sends us his abridged catalogue of lifts, hoists, and cranes, illustrated with well-executed diagrams. This contains a great deal of information in a small compass, in regard to the electric lifts and the high and low pressure hydraulic lifts manufactured by the firm. The illustrations show high-pressure cellar hoists and incline hoists, in the latter of which the guides are formed with steps and form a staircase in addition; the high-pressure suspended hydraulic passenger-lift, adapted for working off the mains of the Hydraulic Power Co., at 700 lbs. per square inch, and which Mr. Stannah puts forward as "the ideal lift for passengers"; and the low-pressure hydraulic passenger-lift, for use in towns which have not high-pressure mains, and which can be supplied either from the City mains or from pumps worked by gas or electric motors. We have also descriptions and illustrations of goods lifts, warehouse and wharf cranes, hand-power lifts, &c.

The New Expanded Metal Co. send us their "Handbook of Practice, Tests, and Tables of Approved Formulæ" relating to the employment of the metal in concrete, plaster work, &c. This consists of considerations in reference to the use of steel in combination with concrete; diagrams and descriptions of various applications of expanded metal and concrete, and some reports and opinions on the behaviour of the construction under tests; one from the British Fire Prevention Co., which speaks both with authority and impartiality. In the first portion of the pamphlet the writers have hardly made as good case as they might; for it is not correct to say, as a general proposition, that "the cohesion between steel and concrete is thoroughly satisfactory"; in the case of rods and wires it is not, and they have a tendency under strain to pull through the concrete. The advantage of expanded metal over rods or wires is that it makes a complete key with the concrete, and cannot pull through it. The pamphlet contains a good deal of practical information in regard to a system which has much to recommend it.

The Luxfer Prism Companies send us a most compact and conveniently made-up pocket-book, in leather cover, giving every information that can be required for architects using their materials. It includes a description of the principle on which their prism glass is made, full directions for specifying it, and a number of useful constructional diagrams showing the manner of fixing various forms of their glass in various kinds of frames. Architects who are using any of these forms of glazing will do well to get a copy of this book.

The Lighting Corporation, Ltd., of 4, Bloomsbury-street, W.C., have sent us their illustrated catalogue of "Wenham" glow and arc lamps. It is claimed that by using these glow lamps consumers effect a saving of 25 per cent. in their meter bills. They are made for all voltages up to 250, and their price is moderate. A large variety of "fancy" lamps for decorative purposes are illustrated, and high candle-power and "focus" lamps for special purposes are also shown. In the "Corporation" lamp for street lighting the reflector does not form part of the lamp, but can be removed from it when the lamp gives out and fitted to a new bulb. The "Wenham" enclosed arc lamps for direct and alternating current are simple mechanically, and will not easily get out of order. Single direct current arc lamps are quoted for running on 200-volt circuits, and two in series can be run economically at any voltage between 200 and 250.

A handsomely got up illustrated catalogue of the "Benson Electric Light Fittings" shows a great variety of designs, mostly good, certainly of a far higher order than we usually find in catalogues of this class of work. A good deal of the effect of these results from the pleasing and well-considered forms in which the glass shades are designed. Some of the metal portions show too much naturalistic tendency in the leafage; in this as in many other such catalogues, the designs on the simplest lines are the best.

The Dudbridge Iron Works, Stroud, send us their catalogue of gas and oil engines and gas-producing plants. The engines appear to be of strong and simple design, and the producer plant is in compact form, requiring no brick-work beyond fire-brick lining for the generator.

Messrs. C. Nurse & Co. send us their catalogue of engineers and joiners' tools and machinery, a volume of over 300 pages, containing illustrations, prices, and particulars of practically all the hand and small machine tools required in a workshop. The series of gauges and measuring instruments catalogued is very complete.

Correspondence.

IN REGARD TO FIRE INSURANCE.

SIR,—Referring to the comments in your issue of 11th inst., on Mr. C. Spensley's pamphlet "How to Insure against Fire," perhaps, in equity, the courtesy of your columns may be afforded to a few statements in defence of the Fire Offices.

Your reviewer contends that considerable dissatisfaction exists among insured persons ("Insurers," by the way, is a term which can be applied to the companies *only*) in regard to the settling of claims, inveighs against the present practice of dealing with losses, and indicates that it might be well were offices to generally issue "Valued Policies."

Indemnity being the fundamental principle of a fire insurance contract, the insured is precluded from making a profit out of any fire loss he may sustain, and it will be conceded by all right-thinking people that the basis of indemnification is the only proper one on which the business should be conducted.

On a loss occurring, the companies require all reasonable information in regard to the claim; due allowances having to be made for depreciation, and salvage if any. All claims, except those of a trifling nature, are dealt with by professional fire loss assessors, unattached to any particular office, and qualified by training and experience to deal with settlements. Provided that a claim is just and *bonâ fide;* that all necessary information is accorded; that reasonable facilities are afforded the assessor in the pursuit of his duties; and that the office is not one of the few "irresponsibles;" it may be said most emphatically that there will be no conflict between the insurer (or insurers) and the insured. Too many of the community nowadays look on the companies as philanthropic institutions; consequently their claims, when they have occasion to make them, are sometimes grossly inflated. This naturally causes delay, and the companies are often stigmatised as exacting and niggardly, whereas the fault lies solely with the insured. Assessors and fire office officials are only too ready to pass an absolutely just claim, but such a thing is almost a *rara avis* in these days. The impression that assessors are paid salaries to browbeat claimants is quite erroneous. They simply receive fees as licensed valuators.

I have not had the opportunity of seeing Mr. Spensley's pamphlet, but I am certain that no "insurance expert" worthy of the name would put forth a plea for the adoption of "valued policies." The British fire offices have sedulously refrained from generally granting such instruments, their principal reasons being as follow:—

1. A valued policy would mature only in the event of total destruction of the property covered. Only a small number of fires out of thousands yearly occurring in these isles result in complete "burns-out." Therefore, to secure the necessary trustworthy valuations of thousands of properties in order to save trouble (more or less chimerical) in these few instances, would simply have the effect of greatly enhancing the cost of insurance.

2. If such valuations were done without, evilly-disposed persons could purposely over-insure property, with the possibility (a moral certainty practically in remote country districts) of reaping a profit from the handiwork of the fire-fiend.

3. The mutability of values, too, must be taken into consideration. Property valued at 2,000*l.* to-day may shortly, through various causes, be worth only 1,200*l.*, and, if the owner were privileged in event of loss to recover the former sum, fire would be a contingency rather to be welcomed than carefully guarded against. In fine, "valued policies" would put a premium on incendiarism, which *Deus avertat!*

Insurance companies do not all work together. There are two divisions, "tariff" and "non-tariff." The former class, comprising the large and important offices, charge rates for certain classes of risk which experience has proved to be requisite. The latter class, consisting almost entirely of the small fry, charge what rates they like, professing to deal with risks on their merits, a proceeding which simply means under-cutting the tariff offices, whereas their contention would require them to raise at times above tariff rating, but this is for them a thing unheard of.

To talk of insured persons having to fight an "Insurance Trust" would seem to be a covert gibe against the tariff organisation.

Surely the present position of our strong offices is owing in no small degree to the salutary rating and other principles laid down by the tariffs, principles by which reckless rate-cutting and ruinous competition is prevented.

Every facility in effecting insurances is now offered to property-owners; but let it be dinned

into the ears of such that companies of known repute are those with which they ought to deal. If people persist in placing business with tiny concerns who fight and quibble over even reasonable claims —well, experience teaches!

Much could be written of the generous manner in which our standard institutions meet certain claims *ex gratiâ—i.e.*, make payment in cases where they are not strictly liable; but enough has perhaps been said to do something in the way of refuting aspersions on the organisations which stand between many of the commonwealth and—ruin.

J. JAMESON LAMONT.

Edinburgh, October 16.

[*** We are glad to print the views of an advocate of the insurance companies. When Mr. Lamont writes that a just claim is almost a *rara avis* in these days, he appears to admit Mr. Spensley's contention. The meaning of Mr. Lamont's words is that each claim must with rare exceptions be resisted. When insurance companies start with the idea that all men are rogues, it is obvious that they must constantly try to resist claims which should be at once admitted. There is much more to be said in favour of valued policies than our correspondent admits.—ED.]

THE ELLIPSE AND THE TUDOR ARCH.

SIR,—The two methods described by "Knox & Wells" are quite distinct; the second is the Gothic method, and no one would use a true ellipse in a Gothic arch. A friend of mine sent me a very ingenious instrument for drawing a Tudor arch by a bent stick, and it certainly gave a very pleasing curve.

"Knox & Wells'" method and "W.P.'s" trammel are Greek instruments of the third-class (see the *Builder*, July 12, 1902, fig. 4). It seems that the arrangement there shown gives an ellipse, and that irrespective of the shape of the triangle; perhaps "T. L. B." will enlighten us on this point.

It is quite refreshing to find that so much attention is being given to curves.

DANIEL WOOD.

BOOKS RECEIVED.

A NEW SYSTEM OF HEAVY GOODS TRANSPORT ON COMMON ROADS. By Bramah J. Diplock. (Longmans.)

A HANDBOOK OF THE OPEN-AIR TREATMENT IN A SANATORIUM. By Dr. Chas. Reinhardt and Dr. David Thomson. Second edition. (John Bale, Sons, & Danielsson.)

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

18.—TIMBER—DRY-ROT—WET-ROT—PRESERVATION—FIREPROOFING.

CHEMICAL COMPOSITION.—Chemistry has not hitherto been of any service to the builder as an aid to the distinction of good from bad timber, but it is possible that, as our knowledge of chemistry advances, acquaintance with the science may prove of practical utility even for the timber merchant. Chemistry has, however, already given rise to a new and rapidly growing industry entirely dependent upon the use of wood for constructive purposes, for it is by chemical treatment that timber is protected from the attacks of destructive insects and fungi, and by chemical treatment that it is rendered fireproof or fire-resisting.

The woody tissue of timber consists mainly of cellulose ($C_6H_{10}O_5$) and a closely allied compound known as lignin ($C_{18}H_{24}O_{10}$). Sometimes the mixture of these two substances is termed "ligno-cellulose." Several compounds closely resembling cellulose in composition and properties are known, and it is probable that all trees contain two or three members of this cellulose group, but so little is yet known concerning their respective functions in plant life that it would be useless to discuss them here.

The sap of trees contains water, albumen, tannic acid, resinous matter, and a number of other substances of complex composition. If timber be not properly dried, the sap is liable to putrefy or ferment and cause the timber to decay, owing to chemical decomposition of the woody fibre taking place. The process of drying the timber is termed *seasoning*, and is most commonly performed by stacking it for many months or years under shelter, in such a manner that fresh air can readily circulate around each piece. The timber gradually becomes dry, principally owing to the evaporation of the water of the sap; but oxidation also plays an important part in destroying the ferment spores and hardening the resinous matter. Sometimes the sap is first partially washed out of the timber by chaining it down under water in a running stream for several days. This latter process is termed *water-seasoning*.

The *heartwood* or inner portion of the trunk of a tree is harder, stronger, and more durable than the *sapwood* or portion in closest proximity to the bark. The sapwood is softer and lighter in colour than the heartwood, from which it can usually be readily distinguished. It is said, however, that much of the American walnut imported into this country for the use of cabinet-makers consists of sapwood dyed to render it indistinguishable from the more costly heartwood, although furniture constructed with this sapwood is greatly inferior to that constructed with heartwood.

Different woods do not vary so largely in chemical composition as might be anticipated. The following are the results of some analyses made by Chevandier :—

Variety of Wood.	Carbon.	Hydrogen.	Oxygen.	Nitrogen.
Beech	49·89	6·07	43·11	0·93
Oak.....	50·64	6·03	42·05	1·28
Birch	50·61	6·23	42·04	1·12
Aspen	50·31	6·32	42·39	0·98
Willow	51·75	6·19	41·08	—

Water in Wood.—The amount of water in living wood is greatest in the summer months whilst the growth is not active. Timber should always be felled in the winter or early spring, when the tree is dormant and contains the smallest proportion of water. Even when felled in winter about 40 per cent. of the total weight of the tree consists of water. After felling, the bark is stripped off, the trunk is raised off the surface of the ground, and allowed to air-dry under shelter for several years. When thoroughly seasoned, the timber contains from 10 to 20 per cent. of water. Timber is commonly regarded as sufficiently seasoned for carpenter's work when it has lost about one-fifth of its weight, and sufficiently dry for joiner's work when it has lost one-third of its weight. Some woods, however, contain a much larger proportion of water than others, and it is not possible, therefore, to determine the condition of the wood by its loss in weight.

The following table shows the specific gravities of some green and air-dried woods respectively, as determined by Karmarsh :—

Variety of Wood.	Specific Gravity. In the Green State.	In the Air-dried State.
Ash	0·852	0·692
Birch	0·919	0·713
Box	—	0·971
Ebony.....	—	1·259
Elm.....	0·909	0·619
Oak	0·973	0·785
Pine.....	0·920	0·467

The difference in the specific gravities of green and air-dried pine is especially noteworthy, as affording an indication of the large proportion of water contained in this wood. The specific gravity of ebony being higher than that of water, this wood will not, of course, float in that liquid.

Timber exposed to the weather so that it is alternately wet and dry decays rapidly unless protected by paint or other preservative.

Dry-rot.—Dry-rot in timber is produced by the growth of a fungus known as *Merulius lacrymans*, or *Merulius destruens*. This fungus is propagated by spores. It first appears on timber as a network of fine cells, called *mycelium*, but soon develops into a number of denser rounded masses. The colour and appearance of the fungoid growth is dependent upon the conditions under which it develops. In some cases it spreads in web-like fibres over the surface of the wood, while in others it forms thin bands or cords. It usually possesses a brown colour, but may be white, greyish-white, yellowish-red, or some other colour. Timber attacked by dry-rot emits a musty odour, assumes a darker colour, loses weight, and is frequently also attacked by wood-boring insects. The fungus continues to grow so long as it remains in the neighbourhood of any sound timber from which it can derive nutriment. When the fungus has been at work for a considerable time, the timber is found to have been converted into a friable, honey-combed mass, so deficient in strength that it may easily be crumbled to powder between the fingers.

Causes of Dry-rot.—The fungus which causes dry-rot thrives best in a warm, moist, stagnant atmosphere. Deficient ventilation is, therefore, a common cause of dry-rot. It may also be caused by painting or tarring timber before it has been sufficiently seasoned.

Dry-rot is liable to develop upon the ends of timbers built into walls unless protected by metal shoes. It frequently attacks wood in warm cellars, and in basements used as kitchens. Oil-cloth or other impervious covering laid upon damp floorboards is also favourable to the development of dry-rot.

Prevention of Dry-rot.—Use only thoroughly seasoned timber; do not allow the timber to remain in contact with a damp surface, and, where possible, ensure that a current of fresh air shall always flow along at least one side of the timber. Impregnation of the timber with creosote is, where practicable, a good method of rendering the timber proof against the attacks both of fungi and of wood-boring insects.

Wet-rot is produced in wood that is alternately soaked with water and exposed to a moist, stagnant atmosphere. It often occurs in living trees. The heartwood is attacked by a fungus and disappears, while the sapwood continues to live. In this way trees with hollow trunks are formed. Wet-rot, like dry-rot, is the result of the development of a fungus which thrives upon the nutritive portion of the wood, and leaves the remaining portion so weak and friable that it is readily blown to powder by wind and washed away by rain.

Preservation of Timber. — Thoroughly seasoned timber may be preserved to a certain extent by painting, but a coat of paint placed upon insufficiently seasoned wood tends to destroy rather than preserve it, for the moisture of the sap is prevented from escaping, and the timber consequently soon commences to rot.

Railway sleepers are most commonly preserved by treatment with creosote. Creosote is one of the distillates obtained from coal tar, and contains carbolic acid, naphthalene, and other antiseptic compounds. The sleepers are placed in an iron cylinder from which the air may be subsequently pumped in order to withdraw the air from the cells of the wood. Creosote heated to a temperature of about 120 deg. Fahr. is then forced into the cylinder under a high pressure (Bethell's process). The amount of creosote absorbed per cubic foot of wood is from 10 lbs. to 12 lbs. in the case of soft woods, but considerably less in the case of hard timbers. Sometimes the timber to be creosoted is merely soaked in a tank of the hot creosote.

Creosote has up to the present time proved the most effective of the cheap liquids for preserving timber. It coagulates the albumen of the sap and destroys or repels all the varieties of fungi or insects which commonly feed upon or bore into timber.

Carbolineum or *Carbolineum Avenarius* is a preservative liquid, said to be obtained by mixing anthracene oil with linseed oil and certain antiseptic substances. It is often used for painting telegraph poles and fences, as it prevents water from soaking into the wood. Anthracene oil, like creosote, is a distillation product of coal-tar.

Kyan's Process, which was introduced in 1834, consists in treating the timber with a dilute solution of corrosive sublimate. The bichloride of mercury combines with the vegetable albumen and preserves it from fermentation. Mercury bichloride is, however, comparatively costly, and is also objectionable on account of its very poisonous character.

Boucherie's Process consists in impregnating the wood with copper sulphate.

Burnett's Process consists in impregnating the wood with zinc chloride.

Fireproofing Timber.—A large number of recipes for rendering timber fireproof by treating it with certain salts have from time to time been recommended, but many of the salts proposed are comparatively costly and materially increase the weight of the timber. In some cases, moreover, the treated wood is discoloured, its elasticity is considerably reduced, and it corrodes iron nails or other metals with which it is placed in contact.

Timber exposed to frequent rains or washed by sea-water cannot, of course, be rendered permanently fireproof by simple impregnation

with a soluble salt, although such salt may be useful for sheltered timber.

The following are some of the materials which have hitherto been most extensively used for fireproofing timber :—

1. The timber is first painted with a solution of sodium silicate, and then with limewash. Insoluble silicate of lime is thus formed in the cells of the wood. (Abel's process.)

2. The timber is heated with a solution of ammonium phosphate. This soluble salt is liable to be washed out of the wood, and has a corrosive action upon iron.

3. The timber is treated with borax and sulphate of magnesia to produce insoluble borate of magnesia in the pores of the wood.

4. The timber is soaked in a solution of tungstate of soda. This is costly, and greatly increases the weight of the timber.

5. The timber is carefully limewashed. The limewash considerably reduces the inflammability of the timber, but cannot be said to render it non-flammable.

A method of rendering timber permanently fireproof without materially reducing its strength or unduly increasing its weight and cost has yet to be discovered, but sufficient success has already been achieved to render fireproofed timber a material which may in many cases be used in place of inflammable timber with great advantage. For the timber work in exhibition buildings and in factories fireproofed wood should always be employed, and it has already been extensively used as a substitute for inflammable timber in modern battleships.

The term "fireproof timber" has, of course, been used in the present paper to denote non-flammable wood, and not a timber that will resist gradual destruction by intense heat. No method of treatment can prevent timber from becoming useless as a building material when subjected to a very high temperature for a prolonged period.

OBITUARY.

MR. ROWELL.—We have to announce the death, on the 18th ult., at his residence, Elbury Lodge, Newton Abbott, S. Devon, of Mr. Joseph William Rowell, in his seventy-sixth year. Mr. Rowell was senior partner in the firm of Messrs. J M. Rowell & Son, of the Devon Estate office in that town, and had practised as an architect and land surveyor and agent at Newton Abbott during nearly the whole term of his professional career. Of the principal architectural works carried out by him and his firm in the county of Devon we may instance the following :—The renovation of the parish church of St. Paul at Starcross (built in 1828), and the designs for the pulpit and lectern carved in oak by Messrs. Harry Hems & Sons, of Exeter; the reparation, with the re-roofing, of the ancient church of St. Martin at Exminster; the Constitutional Club, Bovey Tracey; a residence, with stabling, entrance lodge, &c., at Yarty, near Axminster, for Captain C. H. S. Buckle, R.N., at a cost of nearly 5,000*l.*; the Cockington Isolation Hospital, 1897-8, with a ward for special and private cases, built of the local red rock (J. W. Rowell); the Isolation Hospital at Newton Abbott erected last year for the Joint Committee at a contract price of 5,225*l.* (J. W. Rowell); the enlargement and improvement of the boys' Board school at Highweek, near Newton Abbott; the new Board school for girls at Highweek, together with road works, sewers, and so on for the Highweek feoffees (J. W. Rowell); the Sunday schools near St. Michael parish church, East Teignmouth; the stabling at Holcombe Hall, Dawlish, for Mr. Harrison Benn; and, in Newton Abbott, the church of St. Paul, in Devon-square, built in 1861-74 after the Early English style, at the cost of the late Earl of Devon, and the Wesleyan chapel in Courtenay-street, 1869-70, erected at a cost of about 4,000*l.* for 700 sittings (J. W. Rowell). Mr. Rowell was appointed surveyor for the laying out of the Palk Estate, since Lord Haldon's, on the outskirts of Torquay, and was employed by the late Earl of Devon in respect of his property in and around Newton Abbott, which town has been considerably extended during the past thirty or forty years.

GENERAL BUILDING NEWS.

CHURCH, BALLINAHOWN, IRELAND. — On the 15th ult. the new church at Ballinahown, six miles from Athlone, was dedicated. The church, which is Gothic in style, consists of a nave and aisle. It has six lancet windows, with niches occupying the intervening spaces. The transepts are divided by polished granite shafts with ornamental caps. The transepts are lighted by three-light traceried and cusped windows in the gable, surmounted with cinque-foil traceried lights. The apsidal end has a stained-glass window representing the Ascension of Our Lord. The intersection with the nave is marked by a deeply cut and moulded chancel arch, with polished granite shafts and moulded caps and bases and octagonal plinths. The stained glass in the four-light tracery window in the front gable represents the arrival of St. Columkille at Tara. The gallery is in pitch pine, as also is the porch. The tower and spire rise to a considerable height. The exterior of the building is executed in limestone from the Ross quarries at Mountnugent, Ballinasloe. The high altar is of white marble, and has a canopy carried on green marble shafts. The side canopies are inlaid with Irish marbles. The altar is the work of Mr. Thomas Ryan, Dublin. The church was designed by the late Mr. Hague, and on his death the completion of the building was entrusted to his successor, Mr. T. F. M'Namara, Dublin.

CHURCH, BROCKHAMPTON, HEREFORDSHIRE.—A new church has been erected at Brockhampton, near Hereford. Mr. Lethaby was the architect.

LONDON BAPTIST ASSOCIATION CHURCH, STREATHAM.—The foundation-stone of this church was laid on the 23rd ult. The church is designed in perpendicular Gothic, freely treated. The facings are of pressed red brick, and dressings of Bath stone. A tower forms a prominent feature at one corner. The estimated cost of the complete block (without the upper portion of the tower) is 5,238*l.*, the latter being 440*l.* extra. The portion at present being erected is the tower, nave, and vestries only, together with a temporary apse, the transepts being left for completion at a future date. The architects, whose designs were accepted in a recent competition, are Messrs. George Baines and R. Palmer Baines, London.

SCHOOL, HELENSBURGH.—At Helensburgh Dean of Guild Court plans have just been passed for the erection of a school on Newark Villa ground, East Clyde-street. The school is to take the place of Grant-street and James-street schools, and accommodation is provided for about 600 pupils. There will also be class rooms for cookery and laundry. The cost will exceed 10,000*l.* The architect is Mr. Alexander N. Paterson, Glasgow.

SCHOOLROOM, MONKTON COMBE, WILTSHIRE.—New schoolrooms have been provided at Monkton Combe. The architect was Mr. F. W. Gardiner, of Bath.

MUNICIPAL BUILDINGS, ALDERSHOT.—At a recent meeting of Aldershot Council, the Public Grounds Committee reported that they had considered the amended plans for the Municipal Buildings, submitted by Mr. Hutchinson, the architect, and they recommended them for approval, and also that the architect be instructed to prepare the necessary tracings for the Local Government Board, and the working contract drawings. The report was passed.

BUSINESS PREMISES, BIRTLEY.—On the 25th ult. new Co-operative buildings at Birtley were opened. The architects were Messrs. Liddle & Brown, and the builder Mr. Jopling.

NEW BUILDINGS FOR LAMBETH BOARD OF GUARDIANS—The buildings which are now being erected are : new porter's lodge, relief station, nurses' home and offices for the Guardians. This is only part of a larger scheme whereby the present rooms used by nurses in the central administrative block of the infirmary (which are quite inadequate for the nursing staff, both as to numbers and also baths and lavatory accommodation) are set free, and this part used to accommodate sixty-two additional patients : being nine single-bed wards, six three-bed wards, six four-bed wards, one eleven-bed ward. It is proposed to build also a new four-bed observation ward on the site of the temporary offices, and to get a good operating room to the administrative block, the total cost of the whole scheme (as sanctioned by the Local Government Board) being 54,000*l.* to 55,000*l.* The accommodation given in the new buildings is as follows : — In basement :—Muniment room, large stores, and heating chamber, &c. Ground floor (Clerks' Department) :—Clerks' public office, clerks' private office and large central office, accountants' settlement officers', call-over staffs', collectors', superintendent's, relieving officers', lunacy and warrant officers' offices ; lady guardians' room ; public waiting-room ; two large committee-rooms ; private waiting-room ; lavatories ; board-room, 50 ft. by 30 ft. (the old one was only 34 ft. by 23 ft.). The nurses' home contains the following accommodation :—Kitchen, scullery, dining-room, visiting-room, lavatories, cloak-room, and cycle shed. On the first and other floors are matron's rooms (three), charge nurses' room, two assistant matrons' rooms, nurses' sitting and recreation room (30 ft. 6 in. by 34 ft. 3 in.), with lecture-room, box-rooms, cupboards, lavatories, and bathrooms, and bedrooms for 101 nurses and servants. There will be flats over the front bays for airing purposes for the nurses, and easy access to the infirmary by the covered bridge, already mentioned. The building externally will be faced with red bricks and stone dressings, with granite columns at entrance, and all walls are being built with Fletton bricks in cement. The corridors internally will, as far as possible, be tiled, and all materials used in construction that will stand hard wear. The builders are Messrs. W. Lawrence & Sons, of Waltham Cross, and the architect Mr. Sidney R. J. Smith, of London ; Mr. Nightingale being the clerk of works.

CHILDREN'S HOMES, SIDCUP.—In 1899 a site of 62 acres, with a substantial old residence at Halfway-street, Sidcup, was acquired by the Greenwich Board of Guardians at a cost of 250*l.* an acre, with the residence given in. School homes on the cottage principle, as opposed to the old barrack construction, have been erected by the guardians for 525 children, from the designs of Messrs Thomas Dinwiddy & Sons, of Greenwich and London. A portion only of the site has been used ; upwards of 20 acres being in reserve for ultimate building development. The buildings, which are of considerable extent, and comprise twenty-four different blocks, including swimming bath, gymnasium, &c., were publicly opened by the Chairman of the Board recently. The buildings are in full occupation. The contractor was Mr. T. Rowbotham, of Birmingham. Messrs. Morwood & Sons for the engineering, Messrs. Johnson & Phillips for the electric light installation, and Messrs. Tilley & Son for well and pumping machinery.

SWINDON ISOLATION HOSPITAL.—The extensions of the Swindon Isolation Hospital were formally opened on Wednesday, the 22nd ult. The buildings, which have been erected at a cost of 9,500*l.*, were designed by the joint architects, Mr. Geo. E. Halliday and Mr. John W. Rodger, of Cardiff. The contract for the general work has been carried out by Mr. A J. Colborne, of Swindon, and Messrs. J. Williams & Son, of Cardiff, did the engineering work. The chimney stack was built by Mr. Phillip Myles, of Dukinfield, and the terrazzo floors were laid by Messrs. Geary, Walker, & Co., of London. The new buildings comprise a lodge and entrance gateways ; a fever pavilion for twenty-four beds, arranged in two large wards and two special wards for one patient each ; also a laundry block, with which are incorporated the disinfecting station, mortuary, and boiler-house. The wards are heated by steam at atmospheric pressure. The whole of the hot water for laundry purposes and for baths in the pavilions is heated by steam generated in a Cornish boiler, 18 ft. by 5 ft. The laundry is fitted up with the latest appliances, driven by a 6 h.p. horizontal engine.

BOARD SCHOOL, HARROGATE.—The foundation-stone of the new Board school at Starbeck, Harrogate, was laid on the 15th ult. The school is being built at the extreme rear of the playgrounds of the existing school, and provision is being made for accommodating 300 infants (in five class-rooms). On the first floor rooms are provided for the teaching of cookery and manual instruction. The class rooms contain tubular racks connected to the low-pressure hot water circulation, thus enabling the children's cloaks to be dried in wet weather. The work is being carried out under the superintendence of the architect, Mr. T. E. Marshall, of Harrogate.

THE GRAMMAR SCHOOL, LICHFIELD.—The buildings, together with the head-master's house, of the old Grammar School at Lichfield have sold, under a scheme made by the Charity Commissioners, at auction for 1,035*l.*, to the landlord of the Lichfield High School for Girls. The proceeds are appropriated to the cost, estimated at 9,000*l.*, of the new buildings at Borrowcop Hill, Lichfield, now being erected, after designs and plans prepared by Mr. T. Hillier-Pyke, of East Ham, Essex, to accommodate, for the present, 125 day boys and twenty-two boarders, with residences for the head-master and assistant masters. The Conduit Lands Trust gave the site, eight acres, for the new schools, and contributed 4,500*l.* to the building fund, towards which Mr. R. T. Cooper, High Sheriff of Staffordshire, also subscribed 300*l.* The County Council, moreover, have undertaken, it is said, to make a substantial grant in aid of the scientifical and technical departments which the Governors hope to be able to develop at no distant period. Of the old school, which is associated with the youthful days of Dr. Johnson, Addison, Garrick, Dr. Darwin, and Elias Ashmole, the antiquarian, there is an engraving after John Buckler, in Croker's edition (1848) of Boswell's "Life of Johnson." It was founded *temp.* Edward VI., as appears from the record of a small endowment payable out of the former Court of Exchequer, and rebuilt in 1692 at the charges jointly of the City Corporation and the feoffees of the conduit lands.

FREE LIBRARY, NEWTOWN, NEAR CARDIFF.—The memorial stones of the free library in course of erection at Newtown were laid on the 18th ult. The building is in a central position in the town, and the architect is Mr. F. H. Shayler, Welshpool and the builder Mr. E. H. Nicholas, Shrewsbury The stone laid bears the inscription, "This portion of the building was erected by the Co-operative Union, acting on behalf of the co-operators of the United Kingdom, to the memory of Robert Owen, the founder of co-operation."

TEMPERANCE HALL, LINCOLN.—On the 9th ult. the new Temperance Hall at Lincoln, which comprises a central hall and a suite of rooms, named the Lawson Institute, after Sir Wilfrid Lawson, was opened. The total outlay in connexion with the new premises will reach about 8,000*l.* The institute stands at the eastern end of Salter Gate, and covers the site of the old Temperance Hall, which was close to Broad Gate, and the ground previously occupied by a number of cottages and other buildings at the rear of the old premises. With a view to future extensions, a clear space of 300 square yards has been retained. The hall has a balcony and gallery, and seating accommodation is provided for 1,000 people. The building is of red

brick, with dressings of concrete masonry by Messrs. Daniel & Co., of Lincoln. There are three entrances from the north, and emergency exits fitted with panic bolts are conveniently placed. The principal hall is arranged on the plan of a theatre, with circle, pit stalls, and pit. Access to the pit is gained by the central door, and in that portion there is seating for 400. The eastern door forms the entrance to the stalls and the front rows of the circle, extra exits being provided into Thorn-gate, and the west door admits to the upper portion of the circle. In all there are five exits. The stage, or platform, is 36 ft. wide and 19 ft. deep, and the proscenium is 25 ft. wide by 22 ft. high. The footlights are movable, so that when necessary the platform can be extended over the orchestral portion of the hall, and that will give an additional depth of 5 ft. 6 in. The premises contain four dressing-rooms at the back, and the platform entrance is from Thorn-gate. There are ladies' and gentlemen's cloak-rooms for the circle and stalls, and behind the circle is a room 40 ft. by 16 ft., which is to be converted into a refreshment foyer, and is in communication with the kitchen in the basement by means of a lift. On the first floor there is a lecture hall 40 ft. by 25 ft., with double entrances and exits. There is an office for the Secretary on the ground floor. The heating has been undertaken by Messrs. Truswell & Son, of Sheffield, the electric lighting by Mr. Hazledean, Lincoln. The contractors were Messrs. S. & R. Horton, and the architects Messrs. W. Mortimer & Son, Lincoln.

ENLARGEMENT OF TOWN HALL, BATLEY.—It is proposed to extend Batley Town Hall from plans prepared by Mr. W. Hanstock, and the approximate cost of the scheme is 6 500*l.* A second front will be made to face the Market estate. The scheme provides for the retention of the large room, offices for all the officials, committees, a council chamber, and police-court room, with Mayor's parlour and magistrates' retiring-rooms. There will be cellar accommodation in the basement, from which a lift will communicate with the second floor of the building, on which will be situate the assembly-room, &c. There will also be a caretaker's house.

MISCELLANEOUS.

CHANGES IN SOUTH MOLTON-STREET, W.—Messrs. Giles, Gough, & Trollope have been appointed as architects to the Symonds Hotel Co., for new premises on the site of Nos. 3 to 9 in this street. The site of No. 13 has been cleared for rebuilding, and the City Lands Committee of the Corporation of the City of London recently offered the letting by auction, on an eighty years' building lease of the site—covering an aggregate area of 6,000 sq. ft.—of Nos. 57-62, whereof No. 57 is the Globe tavern with a frontage of 114 ft. to the main street, a depth of 55 ft., and frontages to Globe-yard and Haunch of Venison-yard. The architects for the new buildings on the site of No. 13 are Messrs. Read & Macdonald.

STATUE, WEYMOUTH.—On the 20th ult. the memorial statue of Queen Victoria was unveiled by Princess Henry of Battenberg. The cost of the statue, independent of foundations and pedestal, is about 800*l.* The memorial consists of a portrait statue of the late Queen upon a pedestal of Portland stone, and the sculptor was Mr. George Simonds. The total height of the memorial is about 22 ft. The design of the pedestal is also by Mr. George Simonds, and the stonework has been executed by Mr. S. G. Stone. The bronze casting was by Messrs. J. W. Singer & Sons, Ltd., of Frome.

ERRATUM.—In the notice of the Deptford competition, page 363 *ante*, the word "ends" in the top line of the centre column was a misprint for "levels."

AUSTRALIAN LAND REGISTRATION.—The absence of litigation with respect to titles to land is a marked feature of the Australian judicial system, and is a result of the general adoption of the Real Property Act, as devised by the late Sir R. R. Torrens, and which first came into operation in South Australia. It was introduced into New South Wales in 1862, and completely revolutionised the procedure in regard to land transfers, which, until that date, had been largely modelled on law existing in England. The leading features of the Act are, according to the New South Wales Government Statistician, the transferring of real property by registration of title instead of by deeds; the absolute indefeasibility of the title when registered, and the protection afforded to owners against possessory claims, as a title issued under the Act stands good notwithstanding any length of adverse possession. One result of the Real Property Act is that in New South Wales, as in other parts of the Commonwealth, land is bought and sold with the greatest ease. The fees paid for registration are, after certain deductions have been made, devoted to a fund for compensating any holder of a registered title whose claim, by reason of some informality, may prove invalid; but such is the care exercised before a title is granted that instances of this character are almost unknown. Every change of ownership, in whole or in part, has to be inscribed on the title. Thus, if the holder of 5 acres sells a couple he has to return his deed, which is replaced by a fresh one showing him to be the holder of 3 acres, a second one being issued to the purchaser, giving him a title to 2 acres. Thus each deed shows only what land the holder is actually entitled to under its provisions. In this way all disputes respecting land ownership are avoided.

PLUMBERS AND THE PUBLIC HEALTH.—At a meeting for the distribution of certificates of registration at Norwich, on Saturday last, Dr. Cooper Pattin, Medical Officer of Health for the City, said that no one realised more than he did the extreme importance of sanitary work being done properly, and he had reason to know that a steady improvement in that direction was going on. He found every year from the reports that came in from the inspectors in each department that defective plumbing work was steadily decreasing, the defects that did arise being mostly discovered in work done years ago. It was rare to have a defect reported in any work that was done within a recent period. That improvement he believed to be due to the care and the *esprit de corps* which animated all the plumbers of the present day, and he hoped that Parliament would sanction the principle that work of this character should not be done by any one who did not hold a certificate of competency. The plumbers would then be putting themselves in the same position with members of his own profession.

THE HOUSING QUESTION, LIVERPOOL.—The Executive Committee of the Liverpool Housing Association have addressed a letter to each candidate, asking for a statement of his views upon the housing question. They say: There are in the city still about 10,000 insanitary houses and 3,201 cellar dwellings which require to be closed or demolished. Many of these are terribly overcrowded, the report of the Census Commissioners for 1901 showing that the houses of four rooms and less contain 54,390 persons living under conditions of gross overcrowding when tested by a standard which allows two persons to a room, counting two children as one person. The lower parts of the city, as well as districts like Everton, Kirkdale, and West Derby West, are already far too densely packed with houses, and any scheme of housing reform which only aims at replacing the existing insanitary court-houses with block-dwellings and one-room and two-room tenements of small dimensions will do little or nothing to decrease overcrowding of houses upon land. In any case, this plan, the only one as yet considered by the City Council, takes no account whatever of the overcrowded surplus of 54,390 persons above-mentioned. The Association, therefore, urges upon members and candidates for membership of the City Council the urgent importance of municipal building in less congested areas on the outskirts of the city. Land is much cheaper there, and cheap tramway communication now overcomes the objection of distance from work. It may be that the present slum-dwellers would not go out to the suburbs, indeed, that might not be desirable, but thousands of artisans in Everton, West Derby West, and other thickly-populated districts, would gladly avail themselves of municipal cottages at fair rents. The migration of the artisan class would give more elbow-room to the poorer folk who now occupy slums. The speculative builder has largely failed to meet the demand for cheap and commodious houses, the advantage of cheaper transit having been diverted into the pockets of the landlords by a general rise in rents. The health of the citizens, as well as the financial interests of the ratepayers, demand a bold policy of municipal ownership of land and of house property. The candidates are asked to answer the following question:—"Are you willing to support and to advocate the building of municipal cottages on cheaper land in the suburbs of Liverpool, supplementary to the present method of building tenements on expensive land in the central parts of the city?"

THE SLATE TRADE.—A blast, bringing down 200,000 to 300,000 tons of bad rock took place at the Colgwyn Quarry on the 28th ult., the shot being fired by Mr. Justice Bucknill, now on circuit in N. Wales. The Colgwyn, as well as other quarries in the district, has been clearing large quantities of bad rock, but the outlay is amply repaid by the high class of slate produced in the Nantll Valley. Trade is very brisk, and stocks low.

NEW WINDOWS, MARGATE COLLEGE.—The stained-glass windows which have been inserted in Margate College Chapel in memory of those Old Boys who went to the front (over 250), were unveiled and dedicated on the 28th ult., with a special service. The work was done by a local artist, Mr. Hill.

LEGAL.

IMPORTANT WEST-END ANCIENT LIGHT DISPUTE.

THE case of Dean *v.* Maddick came before Mr. Justice Bruce and a special jury in the King's Bench Division on the 27th, 28th, and 29th ult. This was an action by the plaintiff to recover damages laid at 500*l.* for alleged interference with his ancient lights.

Mr. Arthur Powell, K.C., and Mr. J. H. Keeling were counsel for the plaintiff; and Mr. Abel Thomas, K.C., and Mr. D. Pollock for the defendant.

It appeared that the plaintiff is a surgeon residing and practising at No. 69, Harley-street, W., and he alleged that he had suffered damage by reason of defendant having wrongfully obstructed the access of light to ancient windows in his house. Plaintiff took over a lease of the premises, granted for forty years in 1871, by an indenture dated May 25, 1897. For more than twenty years prior to the erection of the building complained of—viz, a building at the rear of No. 67, Harley-street—plaintiff and his predecessors in title had enjoyed the following windows and lights, viz., on the ground floor, a window facing south lighting a lavatory, two windows facing south lighting a small room used as an operating-room, a window facing south-west, in the bay of, and partially lighting, a room used as a consulting-room, a window facing south in the same bay, and partially lighting the last-mentioned room, and two windows facing west, lighting a room now used as a dining-room; on the first floor, lighting a boudoir or music-room, and in the basement a certain skylight and windows lighting the kitchen and domestic offices. Adjoining the plaintiff's premises on the north side are the defendant's premises, No. 67, Harley-street, consisting of a dwelling-house and, until 1901, there was behind it a yard, about 57 ft. long, with a building at the end used for stabling, which, when it was pulled down, was over thirty years old. For more than twenty years before the erection of the building on the site of the stabling, plaintiff and his predecessors had continuously and uninterruptedly enjoyed free access of light over the said yard and stabling to and through the windows and lights before mentioned. In or about April, 1901, defendant pulled down the stabling, and in November or December he erected on the site of part of the yard a building called a maisonette, much higher than the stabling. The plaintiff alleged that this new building materially diminished the access of light to his premises, and he claimed the damages before stated.

The defendant by his defence did not admit that the plaintiff's lights or windows were ancient lights or that the plaintiff had always enjoyed the light he alleged over the stables. He pleaded that he pulled down the stabling in September, 1901, and in November or December caused a new building to be erected on the site. The building was erected upon part of the open space between the old stable and the defendant's main building, and was set back and arranged so as not to damage or interfere with the plaintiff's lights. Defendant further denied that his new building materially or at all obstructed or diminished the access of light to any of the windows or lights in the plaintiff's house, or that the plaintiff had suffered any damage by reason of any of the acts complained of.

Mr. Arthur Powell having opened the case reciting the before-mentioned facts, the following evidence was called:—

Mr. Elgood, an auctioneer, stated that he had visited the premises in question, and he considered that the wall the defendant had erected had diminished the light going into the plaintiff's building. The operating-room and the consulting-room of the plaintiff had had the light interfered with, whilst the dining-room suffered to some extent. Before the defendant's building was erected there was an uninterrupted light right across New Cavendish-street to the plaintiff's house. Having regard to Harley-street being the abode of the medical profession, he was of opinion that the plaintiff's house had been depreciated to the extent of 50*l.* a year, or a capital sum of 385*l.*

Cross-examined: He put down the loss of rent to the diminution of light alone.

Mr. Henry Dean, the plaintiff's father, manager of the London and County Bank, examined, said he often visited his son at No. 69, Harley-street, whilst the stables were up at the rear of the house, and he had been in all the rooms of the house. He had been in the rooms since the erection of the defendant's new building. He had noticed an appreciable difference in the light since the defendant's building had been up, particularly to the consulting-room and the operating-room. The light there was materially affected. The light to the dining-room was also affected. With regard to the basement, the sky could formerly be seen from the housekeeper's rooms, but now the sky was obscured, and all that could be seen was the top of the roof of the defendant's new building.

Mr. Henry Percy Dean, the plaintiff, a consulting and operating surgeon, of 69, Harley-street, said he took the premises in May, 1897, going into occupation the following June. At that time there was a stable there and there was a good light. A good light was necessary for his profession, and he took the house on account of the good light. In May, 1901, he discovered that it was proposed to erect a building where the stable formerly stood, and when the scaffolding was up it was covered with a tarpaulin in order to see what effect the building would have on the light to his house. The result was very marked, the light being very much interfered with. About October the erection of the building commenced, and in November he instructed his solicitor, and eventually the present action was commenced. The defendant's building had been completed, and it covered more ground than the stable formerly did, and was bigger and higher than the building it superseded. The result was that the light had been materially diminished to the dining-room, consulting-room, operating-room, and basement.

Cross-examined: He emphatically denied that he had discussed with defendant or his agents the height to which he would not object to the defendant's building going. He had all along acquiesced in the judgment of his architect, Mr. Scott, who had advised him as to the height to which the defendant's building could go.

Mr. John Scott, an architect and surveyor, of No. 23, Bedford-row, W.C., said he was called in in March by the plaintiff with reference to certain projected buildings by the defendant. At that time there was a very good light in plaintiff's consulting and operating rooms and lavatory. The dining-room was a dull room, and never had a good light. In November defendant's new building was getting on rapidly. The new building projected 13 ft. 6 in. beyond the wall of the old stable, and was that distance nearer the plaintiff's house. The wall of the maisonette rose 9 ft. 6 in. above the height of the old stable wall, the roof going up to a vertical height of 6 ft. 10 in. above that. The loss of light by the erection of the building was as follows to the plaintiff's different rooms, viz., lavatory, vertical, 16 deg. less, and horizontal 23 deg.; operating-room, vertical, 18½ deg., and horizontal, 18½ deg.; consulting-room, vertical, 24 deg., and horizontal, 15 deg.; and in the dining-room a loss of 16 deg. of light. There had also been a diminution of light in the kitchen.

Cross-examined: When he saw the defendant's architects before the building was erected, he was sure he never expressed his approval of the plans. He was sure he disapproved of them.

Mr. David A. Ross, an architect and surveyor, gave evidence that in his opinion the erection of the maisonette by the defendant materially interfered with the light to the rooms complained of.

This being the plaintiff's case,

Mr. Thomas submitted a point of law to his lordship, contending that the plaintiff had no rights to light. Plaintiff held his premises under a lease which expired in 1911. But in 1896 plaintiff agreed to take up a new lease of the premises for twenty-four years from 1911. This being the case, he submitted that all the plaintiff's rights to light and air were taken away by the plaintiff taking the new lease dated 1896 for twenty-four years from 1911. Under that second lease plaintiff gave up all easements over any other property on the same estate, and he had no right to object to anything done on the estate. Now the defendant was a tenant of the same estate as the plaintiff, and therefore the plaintiff's right to sue for any diminished light was gone. If his lordship upheld this view, then there was an end to the plaintiff's case.

Mr. Powell complained that this point was not raised in the defence. But he contended that the plaintiff was not barred from bringing the action, inasmuch as he only claimed for the term up to 1911, and further that the new lease did not come into operation till that date. How could his learned friend raise an objection to a lease that was not yet in operation?

His lordship decided to hear the case out, and to leave the question of fact to the jury.

On behalf of the defendant, Mr. J. Douglass Mathews, F.R.I.B.A and F.S I., said he had examined the premises of the plaintiff. He did not consider that the light of the lavatory had been affected materially by the erection of the new buildings of the defendant. With regard to the operating-room the eastern window was unobstructed. The western window was obstructed to some extent. The room, however, was amply lighted, and there had been no material obstruction in its light. As regarded the consulting-room, there was no material obstruction of the light. It was amply lighted. Both this room and the dining-room had sustained no appreciable loss of light by the erection of the new buildings by the defendant.

Mr. W. H. White, defendant's architect, gave evidence to the effect that defendant's new building caused no appreciable interference with the light of plaintiff's premises.

Mr. Edw. Robert Robson, F.R.I.B.A. and F.S.I., said he had had great experience in light and air cases. He had in June last carefully examined the buildings in question, and the plans and the angles of light. Plaintiff's dining-room had never been a well-lighted room, and its light could not have been affected by the defendant's building. The consulting-room was an amply lighted room, and a little diminution in the light to the south-west window would not appreciably affect the light of the room. The loss there was absolutely immaterial. With regard to the plaintiff's operating-room, the witness said he was of opinion that the light there was not materially affected by the defendant's new building. The lavatory in the plaintiff's house was well lighted, and was now as good as it always had been. In his opinion, the plaintiff's house was not prejudicially affected by the defendant's new building with regard to the light. Its general attractiveness was certainly not affected so far as rent was concerned. He thought it was rather improved by the removal of the stables and the erection of the defendant's new building.

Professor Beresford Pite, F.R.I.B.A., said he had had a large experience in dealing with questions of light and obstruction of light. In June last he carefully examined the plaintiff's premises. He had already become acquainted with the defendant's premises. He was of opinion that defendant's building did not take away any necessary light or material light from the plaintiff's lavatory window, and that the defendant's new building beneficially affected the lavatory. The effect of the defendant's new building on the light to the plaintiff's operating-room was inappreciable, neither did the new building affect the light to the consulting-room. With regard to the dining-room, he thought that no case existed on paper as to the loss of any light to this room. Generally, the plaintiff had not in his opinion suffered any loss of light that was appreciable.

Mr. Samuel Clarke, estate agent, auctioneer, and surveyor, of New Cavendish-street, said he was of opinion that the letting value of the plaintiff's house had been improved by the erection of the maisonette in the place of the old stables.

Mr. J. T. Bedford, of Wigmore-street, house agent and surveyor, gave evidence of a similar nature.

This evidence closed the defendant's case.

In the result, the jury, after deliberating for an hour and a quarter, intimated that they could not agree on a verdict. The parties, however, agreed to accept the verdict of the majority, when the jury returned a verdict for the defendant by a majority of 10 to 2.

Judgment was entered accordingly.

CASES UNDER THE EMPLOYERS' LIABILITY ACT.

THE case of Pearce *v.* Robertson, a report of which appeared in our last issue, came again before the Marylebone County Court last week. The plaintiff, it may be remembered, was William George Pearce, a bricklayer, 14, Crawford-buildings, Marylebone, W., and he brought an action, under the Employers' Liability Act, against Messrs. Robertson & Sons, builders and contractors, 141, Edgware-road, W., claiming damages in respect of personal injuries, alleged to have been sustained through the negligence of the defendants or their servants.

The main question was as to the cause of an accident which occurred to the plaintiff whilst he was assisting in removing an old bressemer from over some stable doors in Wood's-mews, off Park-lane, W. Plaintiff's case, briefly, was to the effect that a man named Tennant was acting as foreman on the job, and told him not to use a scaffold for the work; and that while Tennant and an apprentice named Houghton were pulling one end of the bressemer, and he (plaintiff) was at the other end, the huge piece of timber "gave a jerk," causing him to fall and injure himself.

The defence, in effect, was that Tennant was not acting as foreman, but that Mr. James Robertson had charge of the job, and had previously told plaintiff to use what scaffolding might be necessary, and that the plaintiff overbalanced while standing upon a pair of ordinary builders' steps.

The questions which the Judge put to the jury, and the answers given by the jury were as follows:—1. Were there scaffolding, planks, and trestles on the premises?—Yes. 2. Was the plaintiff bound to obey the orders of Tennant?—Yes. 3. Or was he merely to be at liberty to assist him?—No. 4. Did Tennant tell the plaintiff not to get scaffolding, but to work on steps?—Yes. 5. Or did he ask him to do so?—(No answer.) 6. Or do you think that Tennant was guilty of negligence in so doing?—No. 7. Do you think that Tennant or Houghton or either of them started moving the bressemer without warning?—No. 8. Was the accident caused by the plaintiff working on the steps?—Yes. 9 Or by Tennant or Houghton, or either of them moving the bressemer without notice?—No. 10. Or by both?—(No answer.) 11. Do you think that the plaintiff consented to work on the steps willingly, and voluntarily incurred the risk?—No. 12 Amount of damages, if any?—50*l*.

There was a long discussion as to whose favour the verdict was in, but ultimately his Honour entered judgment for defendants, with costs, giving leave to move for a new trial, the application for judgment on the jury's finding to be taken as an application under the Workmen's Compensation Act.

AT the Brompton County Court (London) on Tuesday, before Judge Stonor and a jury, James Butcher, a builder's labourer, 80, Lot's-road, Chelsea, S.W., brought an action, under the Employers' Liability Act, against the London County Council, claiming 234*l*. in respect of personal injuries said to have been sustained owing to negligence for which the defendant Council were responsible.

Mr. A. H. Carrington, counsel, appeared for the plaintiff, and Mr. J. Dumas, counsel, for the defendants.

Plaintiff's counsel explained that in August last his client was in the employment of the London County Council, assisting in some works connected with the formation of a pumping-station at Lot's-road, Chelsea. A large scaffold had been erected, consisting of heavy standards with ledgers across them, upon which were placed putlogs and scaffold boards. Below this scaffold were large and heavy pieces of stone which were required to be pulled up by means of a block and fall from a trench. The plaintiff and another man were told by the general manager, and also by the foreman on the job, to pull up these pieces of stone. They had got one piece up safely, and were pulling up a second piece when the rope appeared to have caught one of the putlogs, which had not been properly tied or otherwise secured, and which fell upon the plaintiff's head. The injuries were very serious, involving, it was said, concussion of the brain, impaired sight, &c.

The plaintiff bore out his counsel's opening statement.

In cross-examination, the plaintiff said that it was impossible for them to lift the pieces of stone up without using the pulley. When a putlog was near a wall it was generally fixed in a hole in the wall, but if the end of a putlog came near a space, such as a window opening, he considered that it ought to be fastened by a rope.

Mr. Christopher Richard Griffiths, architect and surveyor, Gray's Inn, stated that he had inspected the works in question, and found that in some instances the putlogs were not lashed to the ledgers. He considered it a highly dangerous thing to direct labourers to use a pulley near putlogs overhead which were unlashed to the ledgers.

Mr. William Robert Pether, a consulting engineer, Mansion House-chambers, E.C., gave evidence generally corroborating that given by the last witness.

Charles Cutler, foreman scaffolder, in the employment of the London County Council, said that it was not usual to lash putlogs to ledgers, provided they were not in the immediate neighbourhood of such a thing as a pulley. Between the two standards where the pulley in question worked, the putlogs that were lodged in the wall at one end were cut off at the other end, so that there should be no projection for a rope to catch. Witness however admitted that these putlogs were not lashed to the ledgers.

The Judge: The evidence of this witness seems to settle the whole case. It is quite clear that, although they cut off the front ends of the putlogs, they did not tie them, and the question is whether the jury think that they ought to have tied the putlogs. I think we ought now to ask the jury: What damages?

Mr. Dumas: I must say, your Honour, that the case has taken a turn which I did not expect.

The jury found that the putlog was used in an unsafe way, owing to it not being lashed, and they assessed the damages in the plaintiff's favour at 150*l*.

His Honour gave judgment accordingly, and allowed costs.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

13,307.—SOLDERING IRONS: *F. G. Wallis and E. Bagnall*.—The tapered ends of a twisted wire or iron bar which carries the bit of the soldering-iron, either at a right or other angle, are fixed into the handle, and the bit is fashioned with a hole and channels for the wire or bar.

13,310.—FLUSHING MECHANISM: *A. Barraclough*.—A bell, having an annular recess, or, in some cases, a flap valve, that will start the flush when it is lowered, is disposed over a cone which communicates at its base with the shorter leg of the siphon. A small siphon leading from a container that takes the float of the ball-cock will supply an after-flush. A butt-and-flange joint for the flushing pipe consists of a flange thereon, which is fastened with a hollow nut screwed into a collar.

13,351.—INSULATION OF ELECTRICAL CONDUCTORS: *C. E. Woods*.—For insulating purposes the conductors are covered with the split intestines of animals which, when moist, are laid around them lengthwise or are wound in spirals having overlapping edges, and then, on occasion, overlaid with some waterproofing substance.

13,370.—MECHANISM FOR THE BUCKETS, &C., OF CRANES: *W. Taylor & W. S. Hubbard (Taylor & Hubbard)*. For opening and closing the bottoms of buckets and skips automatically, the inventors link the flaps to a rod that is joined to the lifting-chain. To the body of the bucket they join a sleeve, through which the rod is inserted, and which has a conical and shouldered top. A sleeve consisting of two portions bolted together is hung from the jib, and is slotted to take projections from bell-crank triggers, which will engage with the shoulder of the first-mentioned sleeve, and are, under normal conditions, drawn upwards with springs, their play sideways being restricted by means of projections that engage with slots on the sleeve of the jib. When the loaded bucket is drawn up, the conical end of the sleeve forces the triggers apart so as to then close together beneath the shoulder; but as the load is lowered, the triggers will be pressed downwards by the weight of the bucket, and their horizontal arms will become engaged with projections from the arms that springs press inwards; when more of the chain is paid out, the flaps of the bucket open, whilst the triggers sustain the bucket; then as the bucket is again raised and its weight is taken by the chain, the triggers are drawn outwards by means of their springs as they turn on their fulcrums, whereby, when the bucket is again lowered, the sleeve of the rod falls, and as its shoulder becomes engaged with the arms, the triggers are freed, and will resume their place in readiness for the next turn.

13,373. — A Float Valve for Flushing Mechanism: *A. W. Murray.*—Discharge ports are formed in the valve casing which is screwed on to the end of the supply pipe, and they will be closed, normally, with a disc and will effect a noiseless discharge on to the outside of the pipe, a heavy washer covers the disc valve which has a middle aperture for the flow of water into the receiver above it, in order to force the valve on to its seating, a cap which is worked by the counter-weighted arm of the float-lever normally keeps shut an extension from the top of the valve, the cap will rise as the float falls, and thus water can escape from the top of the valve, the cistern being refilled as the valve is lifted by pressure in the supply pipe.

13,391.—Improvements in Locks and Fastenings of Doors, &c.: *G. Höybye and G. Thalbitzer.*—The cylindrical casing of a spring-worked bolt is fashioned in two portions and is fastened within a mortise cut in the door, on the bolt is mounted a guiding-block which is pierced for the engagement of two ends of crank-levers, press-buttons in the door-handles are coupled to the other ends of the levers, a stem from the guiding-block will enter a hole in a revolving block to be turned with a key, and one can withdraw the bolt by pressing the button when the hole registers with the stem. The bolt cannot, however, be withdrawn if the block is so turned that the hole does not register with the stem.

13,401.—Means of Ventilating Ice-safes and Similar Receivers: *F. W. Sutton.*—A fan driven by clockwork draws the air through a pipe, and is combined with an auxiliary and adjustable regulating fan.

13,413.—Kilns for Cement-burning: *F. Kilby.*—A small shaft-kiln especially intended for the burning of cement, and also available for burning bricks, lime, plaster, and so on, is squared in section and has apertures into the ashpit for a forced-draught current, and doors lined with fire-brick in its side. A central draught is provided for by means of a divided arch near the top of the shaft.

13,415.—Holders for Incandescent Lamps: *G. Wallace.*—Two tubular pieces that are affixed to another similar piece constitute the sockets of the holder for two bayonet-capped lamps; the third tubular piece is slotted for the arms of a ring, and is screw-threaded for an outer coupling-ring which retains a flanged cap into which a grip for the cord is screwed; in that tube is put an insulator beneath the arms of the ring, which holds a middle rod having two spring plungers, and two rods having single spring plungers set obliquely through opposite sides of the insulator. The plungers are thus disposed for effecting contact with the lamps, the wires being inserted through cross-holes in the insulator. The lamps can be placed in either parallel or series accordingly as the supply wires and the three rods are connected.

13,438.—A Fuel-economiser: *G. J. Parkman.*—Over the fire-bars is laid a false bottom, having slots, feet, and bars that cross the grate. Under the false bottom slides a plate furnished with side holes and a similar set of cross-bars; thus the two rows of bars will make a bottom closed to the fuel when in one position, but will allow a free current of air when in another. The slots of the false bottom take projections from the bottom of a plate, of which the upper edge lies against the back of the fire-place. The contrivance is claimed as being applicable to any fire-place, and for producing slow combustion in an ordinary stove.

13,439.—An Improved Gas-burner: *A. G. Bayles.*—The inventor seeks to ensure a uniform flow of gas and to obviate waste with a check, or chamber, which he puts within the pillar of the burner, and which consists of two stepped thimbles, having a deflecting plate and a distributor made of gauze. Since the area of the inlets of the chamber is smaller than that of the outlets, a decreased pressure of gas in the chamber is obtained, whilst the pressure is yet further diminished by reason of the chamber, which is formed in the pillar above the check, being larger than the first-named chamber; the capacity of the opening of the tip being at the same time larger than that of the combined outlets.

13,443.—A Soldering-Iron: *W. Pullen.*—Within the handle is a chamber for the generating of acetylene. A tube that contains the wick leads from a water-chamber to that which holds the carbide cartridge. The tube is inserted through an opening in one end of the cartridge, at the other end where are apertures for the escape of gas that are covered at both ends with discs of canvas. The generation of gas is regulated with a screw which presses the cartridge against a spring, and a pipe from the water-chamber communicates with the gas.

13,452.—Making of Artificial Stone: *C. K. Graham.*—For making artificial stone from various cements the cement is first mixed with water to excess, the surplus water being expelled by pressing the moulded goods between felt or wire cutting in a hydraulic press. To the fully hydrated cement may be added disintegrated asbestos fibre and brickdust or other loading material. The moulded articles are specified as being frost and fire proof and available for roofing and kindred uses.

13,464.—A Tackle or Pulley Block: *J. M. Ervin.*—The flat side-plates have a middle flat rib which is deep enough to take the sides of the yoke. The yoke and side-plates have eyes for the sheave-pin, and slots in the side-plates enable the cottar-pins to lie flush with them. Lugs from the bridge-plates are rivetted into holes in the side-plates. Slots in the lower bridge-plate afford a clear way for the ring, and slots in the bridge-plates are engaged with tongues of the division-plate. The entire block is to be made by cold stamping.

13,476.—A Saw-set and a Gauge: *C. Samm.*—The saw-set is in the form of a four-armed anvil. The ends of the four arms are bevelled at different angles. One sets the saw by laying it on the anvil and hammering the teeth down upon the bevels. The U-shaped gauge has an opening wherein a file is secured with a set-screw, and the saw is placed between the legs of the gauge. As the file is moved along the saw it marks the highest teeth. For testing purposes one removes the set-screw and applies the gauge to the teeth. When the saw-blade has been put between the branches, the distance between the latter will be equal to the degree of set.

13,498.—Loading and Unloading Appliances: *Brown Hoisting Machinery Co.*—The load is fed into the bucket from a supply bin overhead. The hoisting ropes are passed around pulleys, and from their other ends are hung weights which, together, are heavier than is the bucket. The eyes of other ropes, which are wound around drums on a shaft having a friction brake, are linked to flaps that form the bottom of the bucket, and those ropes also carry weights. In use, the brake keeps the flaps shut whilst the bucket is being loaded, but when the friction is relaxed the bucket will descend, its flaps being still shut, until the latter weights meet stops, whereupon the load opens the flaps. The flaps remain opened until the bucket is lifted into place for reloading, when the weights will shut them again.

13,556.—Crushers for Stone, Brick, Ore, &c.: *W. H. Baxter.*—A middle rocking standard carries the shaft, and there are bearings in the wings of the swing-jaw for the eccentrics. The shank of the standard is taken by an opening in a cross-head on which are the pivots, or the standard may have a flange at its base to be bolted on to the cross-head. In another form the standard consists of two portions, so that one may adjust its length with packing-pieces, whilst the connecting-bolts will avail as breaking-pieces. Four adjustments are provided for by pivot bearings in the shape of squared blocks having eccentrical eyes. Confer also No. 10,729 of 1899 for the winged swing-jaw.

13,578.—Brushes for Scavengering Roads, and Similar Uses: *S. Rosenfeld.*—Strips or clamps set lengthwise in channelled bars secure the bristles of a rotatory brush which project through slots around the roller and can be drawn in or pushed out by means of cones, or else discs having spiral grooves, that engage with projections from the channelled bars. The bars are either fixed or caused to slide in radial grooves in the end-plates of the rollers. A screwed rod, fitted with hand-wheel nuts, serves for the axial adjustment of the cones or discs.

13,580.—Legs for Shears: *H. Maiden and J. Coutts.*—A rigid triangular frame, on to which a pair of legs is hinged, is stayed with ropes. The top of the frame and the top of the legs are joined together with tackle, which also supports the legs, and of which the falls are passed around pulleys at the top of the frame, and so to the ground-winches. From a point near the top of the legs is hung the lifting tackle.

13,643.—Process of Pulverising and Crushing Stone, &c.: *Piccard, Pictet, et Cie.*—The material is maintained by centrifugal force in contact with the drum of the mill as it rotates upon its hollow journals, and is acted upon in turn by a set of lens-shaped rollers inside the drum, whilst scrapers, carried upon a curved rail, throw the crushed stone from beneath one roller to the next one. A current of air may be impelled through the journals so as to carry the pulverised mass into a receiver.

MEETINGS.

Friday, October 31.

Architectural Association.—Conversazione, Royal Institute of Painters in Water-Colours, Piccadilly, W. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor R. Elsey Smith on "Building Materials." 7 p.m.

Institution of Mechanical Engineers.—An extra meeting, when the discussion upon the following paper will be continued: "Oil Motor Cars of 1902," by Captain C. C. Longridge. 8 p.m.

Saturday, November 1.

British Institute of Certified Carpenters (Carpenters' Hall, E.C.). Monthly meeting. 6 p.m.

Monday, November 3.

Royal Institute of British Architects.—Opening address of the session, by Mr. Aston Webb, A.R.A., F.S.A., President. 8 p.m.

London Institution.—Professor W. M. Flinders Petrie on "The Earliest Kings of Egypt." Illustrated. 5 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor R. Elsey Smith on "Sanitary Building Construction and Planning; Soil and Local Physical Conditions." 7 p.m.

Society of Engineers.—Mr. T. Andrews, F.R.S., on "Effect of Segregation on the Strength of Steel Rails." 7.30 p.m.

Liverpool Architectural Society (Incorporated).—(1) Special general meeting to consider and approve the revised Schedule of Charges, Clauses 10 *et seq.*, 6 p.m.; (2) Ordinary meeting, Mr. S. Pugin Powell on "Heraldry," with special reference to the arms in the windows of the Houses of Parliament. Illustrated by some of the original working drawings. 6.30 p.m.

Tuesday, November 4.

Institution of Civil Engineers.—Address by Mr. J. C. Hawkshaw, M.A., President, and presentation of medals and prizes awarded by the Council. 8 p.m.

Architectural Association of Ireland.—Mr. C. J. M'Carthy on "Three Weeks in Normandy."

Wednesday, November 5.

Architectural Association Discussion Section.—Mr. H. M. Cautley on "The Buildings about a Farm." 7.30 p.m.

British Archæological Association.—Mr. S. W. Kershaw, M.A., F.S.A., on "Oatlands in Weybridge." 8 p.m.

Royal Archæological Institute.—1. Mr. W. H. Knowles, F.S.A., on "Blanchland Abbey, Northumberland." 2. Mr. Philip M. Johnston on "Twelfth Century Paintings Recently Discovered in Claverley Church, Shropshire." 4. p.m.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection in the District of St. Marylebone. 3 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

Thursday, November 6.

Sanitary Institute (Lectures for Sanitary Officers).—Professor R. Elsey Smith on "Ventilation, Warming, and Lighting." 7 p.m.

Friday, November 7.

Architectural Association.—Mr. F. C. Eden on "Roof Coverings." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. Max Clarke on "Calculations, Measurements, and Plans and Sections." 7 p.m.

Saturday, November 8.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Richmond Main Sewerage Pumping Station and Purification Works, Kew Gardens, 2.30 p.m.

The Craft School, 137, Globe-road, Bethnal Green, E.—Mr. C. Spooner on "The Study of Old Furniture, with some Suggestions for Modern Work (with lantern illustrations). 8.30 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

October 8.—By A. & D. Edwards (at Hereford).

Leominster, Hereford.—Upper Wintercott Farm, 200 a. 2 r. 38 p., f., y.r. 300*l.* £6,900

October 13.—By R. & J. Mitchell (at Cockermouth).

Wythop, Cumberland.—Riggs Estate, 131 a. 0 r. 26 p., f. 3,300

October 20.—By Chesterton & Sons.

Kensington.—15, Campden Hill-rd., and 16, Phillimore-mews, u.t. 51½ yrs., g.r. 12*l.*, y.r. 180*l.* 2,570

By Graves & Son.

Westbourne Park.—51, Aldridge-rd. Villas, u.t. 54 yrs, g.r. 10*l.*, y.r. 60*l.* 560

12, Burlington-rd., u.t. 56½ yrs., g.r. 10*l.*, e.r. 65*l.* 400

Shepherd's Bush.—12, Blomfontein-rd., f., e.r. 45*l.* 730

By Horne & Co.

Pimlico.—67, St. George's-sq., u.t. 35 yrs., g.r., &c., 3*l.* 3s., p. 1,220

Kensington.—Addison-rd., i.g.r. 70*l.*, u.t. 73¼ yrs., g.r. 30*l.* 850

Paddington.—26 and 28, Shirland-rd., u.t. 59½ yrs., g.r. 18*l.*, y.r. 99*l.* 935

43, Shirland-rd., u.t. 63 yrs., g.r. 9*l.*, y.r. 52*l.* 400

16, 18, and 29, Elnathan-mews, u.t. 63 yrs., g.r. 14*l.*, w.r. 100*l.* 2s. 820

By Protheroe & Morris.

Leyton.—Church-rd., Osmond House, f., p. 550

By Edward Millard.

New Malden, Surrey.—Coombe-rd, two freehold shop plots 270

October 21.—By G. F. Box & Co.

Camden Town.—8, Park-st. (S), u.t. 14½ yrs., g.r. 1*l.*, y.r. 50*l.* 315

43, Park-st. (S), u.t. 8¾ yrs., g.r. 4*l.*, y.r. 50*l.* .. 165

Regent's Park.—53, 55, and 57, Longford-st., u.t. 20 yrs., g.r. 3*l.*, y.r. 112*l.* 890

Oxford-st.—17, Woodstock-st., Corporation Lease, g.r. 3*l.* 15s., fine 26*l.* 5s. 2,325

By David Burnett & Co.

Forest Hill.—Eweline-rd., f.g.r.'s 32*l.*, reversion in 96 yrs. 860

Pimlico.—23, Cambridge-st., u.t. 5¾ yrs., g.r. 7*l.*, y.r. 55*l.* 600

Bermondsey.—Grange-rd., f.g.r. 6*l.*, reversion in 22½ yrs. 330

2, Ernest-st., u.t. 14½ yrs., g.r. 4*l.*, w.r. 41*l.* 12s. 120

By Chancellor & Sons.

Hampton Court, Middlesex.—Hampton Court-rd.; also cottage, stabling, and blacksmith's shop, f., p. 2,850

By Debenham, Tewson, & Co.

Chislehurst, Kent.—1 and 3, Summer Hill-villas, f., y.r. 120*l.* 1,400

Chislehurst Hill, Calder, f., y.r. 60*l.* 730

1, Mount-villas, u.t. 83¾ yrs., g.r. 20*l.*, y.r. 90*l.* 650

Cambridge.—St. Neots-rd., two enclosures of land, 28 a. 0 r. 12 p., f., p. 850

St. Neots-rd., five enclosures of land, 72 a. 1 r. 9 p., f., p. 1,600

Girton, Cambs.—Moor Barns Farm, 467 a. 2 r. 31 p., f. 7,300

Eastcheap.—9 and 9½, Love-lane (S), area 1,880ft., f., y.r. 200*l.* 4,360

City of London.—5 and 7, St. Mary Axe, area 1,180 ft., building lease for 99 yrs., let at per annum 700

By Norman & Son.

Harmondsworth, Middlesex.—Bath-rd., f.g.r's. 28*l.* 10s., reversion in 76 yrs. 640

Bath-rd., freehold fruit gdn., 1 a. 3 r. 19 p., with buildings thereon, e.r. 30*l.* 550

By Benjamin Norman.

Woodford.—7 and 8, Beachcroft-ter., u.t. 97 yrs., g.r. 9*l.*, w.r. 53*l.* 19s. £335

By J. S. Richardson.

South Lambeth.—17, Aldebert-ter., u.t. 61 yrs., g.r. 7*l.* 10s., e.r. 50*l.* 530

By R. Imeson & Son (at Ripon).

Stonebeck Up, &c., Yorks.—The Summerstone Lodge Estate, 780 a., u.t. 999 yrs., g.r. &c., 26*l.* 14s. 12,100

Ellingstring, Yorks.—The Ellingstring Estate, 80 a. 0 r. 16 p., f. 3,600

By Belton & Sons (at Masons' Hall Tavern).

City of London.—Bucklersbury, Ye Gresham p.-h., u.t. 73 yrs., y.r. 300*l.*, with goodwill .. 8,950

Regent-st.—Little Argyll-st., The Larder p.-h., u.t. 19 yrs., g.r 37*l.*, p., with goodwill 3,500

By Fleuret, Sons, & Adams (at Masons' Hall Tavern).

Kennington.—Stannery-st., The Alderman p.-h., f., with goodwill 19,000

Hitchin, Herts.—Sun-st., The Angel p.-h., u.t. 17 yrs., y.r 60*l.*, with goodwill 1,010

October 22.—By Chetwynd, Lvoyd, & Deane.

South Kensington.—5, Dove-mews, u.t. 66¾ yrs., g.r. 6*l.*, y.r. 50*l.* 340

By R. C. S. Evenett.

Haslemere, Surrey.—Courts Hill, The Ridgways and 2 a., f., p. 2,500

By Matthews, Matthews, & Goodman.

Islington.—3, Prospect-pl. (S), f., w.r. 31*l.* 4s. .. 300

Stoke Newington.—84, Mildmay-pk. (S), f., y.r. 55*l.* 970

City-rd.—2, Macclesfield-ter., f., y.r. 50*l.* 1,020

Bromley-by-Bow.—Blair-st., f.g.r. 14*l.*, reversion in 45 yrs. 395

Poplar.—Bloomsbury-st., f.g.r. 24*l.*, reversion in 40 yrs. 720

Notting Hill.—St. Ann's-rd., f.g.r. 15*l.*, reversion in 58 yrs. 390

Hoxton.—111, Hyde-rd. (S), u.t. 16 yrs., g.r. 7*l.*, y.r. 42*l.* 140

19 and 21, Whitmore-rd. (S), u.t. 16½ yrs., g.r. 3*l.*, y.r. 80*l.* 440

Barnsbury.—Matilda-st., i.g.r. 18*l.*, u.t. 42 yrs., g.r. 1*l.* 235

By Norris, Son, & Hadley.

Putney.—51, Galveston-rd., u.t. 87 yrs., g.r. 10*l.*, e.r. 65*l.* 800

By Ravenshear & Massy.

Ealing.—Westfield-rd., f.g.r.'s 25*l.* 4s., reversion in 97 yrs. 595

Westfield-rd., f.g.r.'s 31*l.* 10s., reversion in 98 yrs. 760

October 23.—By Balch & Balch.

Kentish Town.—49, Dartmouth Park Hill, u.t. 50 yrs., g.r. 10*l.*, y.r. 55*l.* 530

Stroud Green.—96, Regina-rd., u.t. 63 yrs., g.r. 6*l.*, y.r. 32*l.* 290

By Edwards & Daykin.

Kensington.—14, Scarsdale-ter., u.t. 19½ yrs., g.r. 6*l.*, y.r. 50*l.*; also 23, Gordon-pl., u.t. 41 yrs., g.r. nil, y.r. 50*l.* 710

By Garrett, White, & Poland.

Chancery-lane.—15, Took's-ct., area 1,200 ft., f., p. 1,830

By C. C. & T. Moore.

Mile End.—185, 187, and 189, Turner's-rd. (S), u.t. 59 yrs., g.r. 13*l.*, w.r. 117*l.* 1,050

St. George's East.—100 to 108 (even), Cornwall-st., u.t. 26 yrs., g.r. 24*l.*, w.r. 109*l.* 4s. 570

Hackney.—15, The Broadway (shop and warehouse), u.t. 43 yrs., g.r. 6*l.* 10s., e.r. 90*l.* 910

Poplar.—6 and 7, Paris-ter., u.t. 63 yrs., g.r. 6*l.*, w.r. 59*l.* 16s. 685

October 23.—By Newbon, Edwards, & Shephard.

Barnsbury.—33, Arundel-sq., f., y.r. 65*l.* 740

Canonbury.—29, St. Mary's-rd., u.t. 42½ yrs., g.r. nil, v.r. 72*l.* 560

Holloway.—22 and 24, Furlong-rd., u.t. 33 yrs., g.r. 8*l.*, y.r. 91*l.* 210

Homerton.—38 and 40, Templar-rd., f., w.r. 39*l.* 215

Harringay.—Mattison-rd., f.g.r. 7*l.*, reversion in 94 yrs. 430

Streatham.—Gleneagle-rd., f.g.r. 8*l.*, reversion in 94 yrs. 515

Home Park-rd., f.g.r's. 16*l.* 16s., reversion in 94 yrs. 2,170

By Varley & Locking.

Stoke Newington.—36, Mildmay-grove, u.t. 49 yrs., g.r. 4*l.* 10s., e.r. 52*l.* 2,260

By Stimson & Sons.

Lambeth.—205, 205a, and 207, Waterloo-rd. (Young's-buildings), u.t. 60 yrs., g.r. 60*l.*, w.r. 428*l.* 14s. 1,300

Blackfriars.—67 and 69, Webber-st.; also Marshall's-buildings (dwellings), u.t. 59 yrs., g.r. 150*l.*, w.r. 644*l.* 16s. 1,840

Southwark.—Orange-st., Winchester-buildings (dwellings); also the Fox and Hounds p.-h. adjoining, u.t. 40 yrs., g.r. 180*l.*, y.r. 482*l.* 16s. 3,375

Camberwell.—Artichoke-pl., &c., Stobart-mansions (dwellings), u.t. 61 yrs., g.r. 80*l.*, w.r. 465*l.* 8s. 340

Batters-a.—18, St. John's-rd. (S), f., y.r. 175*l.* .. 3,605

Cairns-rd., freehold stabling premises, e.r. 30*l.* ..

Herne Hill.—35, 37, 39, 45, and 61, Winterbrook-rd. u.t. 75½ yrs., g.r. 40*l.*, y.r. 250*l.* 1,200

Battersea.—101 to 107 (odd), Bridge-rd., u.t. 27½ yrs., g.r. 26*l.*, y.r. 132*l.* 310

Brixton.—32, Horsford-rd., u.t. 72½ yrs., g.r. 4*l.* 15s., q.r. 32*l.* 305

Stockwell.—38, Sidney-rd., u.t. 39 yrs., g.r. 5*l.*, y.r. 32*l.* 415

Kentish Town.—75, Castle-rd. (S), u.t. 56½ yrs., g.r. 4*l.* 10s., w.r. 81*l.* 18s. 1,010

Blackfriars.—49, Stamford-st., f., y.r. 75*l.* 700

Camden Town.—242, Camden-rd., u.t. 36 yrs., g.r. 2*l.*, e.r. 85*l.* 713

By Godfrey C. Lambert (at Walthamstow).

Leyton.—Bickley-rd., f.g.r.'s 30*l.*, reversion in 95 yrs. 1,030

October 24.—By A. & A. Field.

Mile End.—119, Cambridge-rd. (S), f., y.r. 55*l.* .. 700

Shoreditch.—King John Court, freehold timber yard, y.r. 52*l.* 945

Walthamstow.—24, 26, and 28, Pembroke-rd., f., w.r. 89*l.* 14s. .....

Leytonstone.—Argyle-st., a plot of building land, f. £310

Spitalfields.—49, 51, and 53, Hanbury-st. (manufacturing premises), u.t. 81½ yrs., g.r. 39*l.*, y.r. 461*l.* 5,930

Whitechapel.—42, 44, and 46, Vallance-rd. (S), u.t. 390 yrs., g.r. nil, w.r. 34*l.* 8s. 4,015

By Jones, Lang, & Co.

Notting Hill.—Portobello-rd., Lonsdale Schools, f., w.r. 71*l.* 10s. 1,410

By Nicholas, Denyer, & Co.

Witley, Surrey.—Wildcroft, and 2 a. 1 r. 30 p., f., p. 1,550

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; w.r. for weekly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.		
Hard Stocks	1 13 0	per 1,000	a ongside, in river
Rough Stocks and Grizzles	1 10 0	,,	,, ,,
Facing Stocks	2 12 0	,,	,, ,,
Shippers	2 5 0	,,	,, ,,
Flettons	1 8 0	,,	at railway depôt
Red Wire Cuts	1 12 0	,,	,, ,,
Best Fareham Red	3 12 0	,,	,, ,,
Best Red Pressed Ruabon Facing.	5 5 0	,,	,, ,,
Best Blue Pressed Staffordshire	4 5 0	,,	,, ,,
Do., Bullnose	4 11 0	,,	,, ,,
Best Stourbridge Fire Bricks	4 8 0	,,	,, ,,
Glazed Bricks.			
Best White and Ivory Glazed Stretchers	13 0 0	,,	,, ,,
Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	17 0 0	,,	,, ,,
Double Stretchers	19 0 0	,,	,, ,,
Double Headers	16 0 0	,,	,, ,,
One Side and two Ends	19 0 0	,,	,, ,,
Two Sides and one End	20 0 0	,,	,, ,,
Splays, Chamfered, Squints	20 0 0	,,	,, ,,
Best Dipped Salt Glazed Stretchers and Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	14 0 0	,,	,, ,,
Double Stretchers	15 0 0	,,	,, ,,
Double Headers	14 0 0	,,	,, ,,
One Side and two Ends	15 0 0	,,	,, ,,
Two Sides and one End	15 0 0	,,	,, ,,
Splays, Chamfered, Squints	14 0 0	,,	,, ,,
Seconds Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.
Thames and Pit Sand	7	0	per yard, delivered.
Thames Ballast	6	0	,, ,,
Best Portland Cement	31	0	per ton, delivered.
Best Ground Blue Lias Lime	22	0	,, ,,

Note.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 10s. 6d. per yard, delivered.

Stourbridge Fire-clay in sacks, 27s. 0d. per ton at rly. dpt.

STONE.

	s. d.		
Ancaster in blocks	1 11	per ft. cube, deld. rly. depot	
Bath ,,	1 7	,,	,,
Farleigh Down Bath	1 8	,,	,,
Beer in blocks	1 6	,,	,,
Grinshill ,,	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,
Darley Dale in blocks	2 4	,,	,,
Red Corsehill ,,	2 5	,,	,,
Closeburn Red Freestone	2 0	,,	,,
Red Mansfield ,,	2 4	,,	,,
York Stone—*Robin Hood Quality.*			
Scappled random blocks	2 10	,,	,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per foot super.	,,
6 in. Rubbed two sides Ditto, Ditto	2 6	,,	,,
3 in. Sawn two sides slabs (random sizes)	0 11½	,,	,,
2 in. to 2½ in. Sawn one side slabs (random sizes)	0 7¼	,,	,,
1½ in. to 2 in. ditto, ditto	0 6	,,	,,
Best Hard York—			
Scappled random blocks	3 0	per ft. cube	,,
6 in. sawn two sides, landings to sizes (under 40 ft. sup.)	2 8	per ft. super.	,,
6 in. Rubbed two sides Ditto		,,	,,
3 in. sawn two sides slabs (random sizes)	1 2	,,	,,
2 in. self-faced random flags	0 5	,,	,,
Hopton Wood (Hard Bed) in blocks	2 3	per ft. cube. deld. rly. depôt.	
,, ,, ,, 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt.	
,, ,, ,, 3 in. do.	1 2½	,,	,,

PRICES CURRENT (*Continued*).

SLATES.

in.	in.	£ s. d.		
20×10 best blue Bangor		13 2 6	per 1000 of 1200 at ry. dep.	
20×12	,, ,, ,,	13 17 6	,,	,,
20×10 best seconds	,,	12 15 0	,,	,,
20×12	,, ,, ,,	13 10 0	,,	,,
16×8 best	,,	7 0 0	,,	,,
20×10 best blue Portmadoc		12 5 0	,,	,,
16×8 best blue Portmadoc		6 0 0	,,	,,
20×10 best Eureka unfading green		15 0 0	,,	,,
20×12	,, ,,	16 10 0	,,	,,
18×10	,, ,,	11 10 0	,,	,,
16×8	,, ,,	8 7 6	,,	,,
20×10 permanent green		10 10 0	,,	,,
18×10	,, ,,	9 0 0	,,	,,
16×8	,, ,,	6 5 0	,,	,,

TILES.

	s. d.		
Best plain red roofing tiles	42 0	per 1,000, at rly. depôt.	
Hip and valley tiles	3 7	per doz.	,, ,,
Best Broseley tiles	50 0	per 1,000	,, ,,
Do. Ornamental tiles	52 6	,,	,, ,,
Hip and valley tiles	4 0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	,, ,,
Do. ornamental Do.	60 0	,,	,, ,,
Hip tiles	4 0	per doz.	,, ,,
Valley tiles	3	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes)	51 9	per 1,000	,, ,,
Do. Ornamental Do.	54 6	,,	,, ,,
Hip tiles	4 1	per doz.	,, ,,
Valley tiles	3 8	,,	,, ,,

WOOD.

Building Wood.—Yellow.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	15 10 0	16 10 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 10 0	12 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	,, ,, ,,
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	9 10 0
2 in. by 4½ in. and 2 in by 5 in.	8 10 0	9 10 0
Foreign Sawn Boards—		
1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.
¾ in.	1 0 0	,,
Fir timber: Best middling Danzig or Memel (average specification)	At per load of 50 ft. 4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Small timber (6 in. to 8 in.)	3 0 0	3 10 0
Swedish balks	2 15	3 0 0
Pitch-pine timber (30 ft. average)	3 5 0	3 15 0

Joiners' Wood. At per standard.

White Sea: First yellow deals, 3 in. by 11 in.	23 0 0	24 0 0
3 in. by 9 in.	21 0 0	22 10 0
Battens, 2½ in. and 3 in. by 7 in.	17 0 0	18 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0
,, ,, 3 in. by 9 in.	17 10 0	19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	15 10 0	16 10 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0	22 10 0
Do. 3 in. by 9 in.	18 0 0	19 10 0
Battens	13 10 0	15 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	17 0 0
Do. 3 in. by 9 in.	14 10 0	16 0 0
Battens	11 10 0	12 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0	14 0 0
Do. 3 in. by 9 in.	13 0 0	14 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	14 10 0	15 10 0
,, ,, 3 in. by 9 in.	13 10 0	14 10 0
Battens	11 0 0	12 0 0
Second white deals 3 in. by 11 in.	13 10 0	14 10 0
,, ,, ,, 3 in. by 9 in.	12 10 0	13 10 0
,, ,, ,, battens	9 10 0	10 10 0
Pitch-pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—First, regular sizes	33 0 0	upwards.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs—Large, per ft. cube	0 2 6	0 3 6
Small ,, ,,	0 2 3	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 7	0 0 8
¾ in. do. do.	0 0 6½	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 10 0	20 0 0
American Whitewood Planks—Per ft. cube	0 4 0	- - -

Prepared Flooring— Per square.

1 in. by 7 in. yellow, planed and shot	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	1 1 6
1 in. by 7 in. white, planed and shot	0 11 6	0 13 6
1 in. by 7 in. white, planed and matched	0 12 0	0 14 0
1¼ in. by 7 in. white, planed and matched	0 14 6	0 16 6

[*See also page 405.*

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Designs for University Buildings, Cape of Good Hope	Agnt.-Gen. for Cape of Good Hope	400*l.*, 200*l.*, 100*l.*	Jan. 31

CONTRACTS.

Nature of Work or Materials.	By whom Advertised	Forms of Tender, &c., Supplied by	Tenders to be delivered
Additions to Workhouse, Clayton	North Bierley Guardians	S. Spencer, Architect, 344, Great Horton-road, Bradford	Nov. 4
Bridge Works, Norbury Hollow, near Stockport	.....	G. S. Doncaster, Surveyor, Council Offices, Hazel Grove	do.
Additions to Glassel House, Aberdeen	.....	Jenkins & Marr, Civil Engineer, 16, Bridge-street, Aberdeen	do.
Schools, Ystradgynlais	.....	P. Williams, Tyr Gorof, Ystradgynlais	do.
Villa, Belgrave-road Bridlington	.....	S. Dyer, Architect, 29, Quay-road, Bridlington	do.
Additions to Lodge, Rockingham-road	Kettering Joint Hospital Board	Gotch & Saunders, Architects, Bank Chambers, Kettering	do.
Road Works	Mansfield Town Council	F. Vallance, Borough Surveyor, Town Hall, Mansfield	do.
Sewers, &c.	West Molesey U.D.C.	J. Stevenson, Engineer, East Molesey	do.
Chapel, Cwmllynfell, Glam	.....	Rev. J. Rees, Cwmllynfell	Nov. 5
Villas, Presbury-road, New Malden, Surrey	.....	V. Davison, Architect, 7, Market-place, New Malden	do.
Clock Tower, Llangefin, N. Wales	.....	Douglas & Mitchell, Architects, Chester	do.
Hall, Hamilton-road, Bangor, Ireland	.....	Young & Mackenzie, Engineers, Belfast	do.
Road Works	Hove (Sussex) Corporation	H. H. Scott, Borough Surveyor, Town Hall, Hove	do.
Station Buildings	North-Eastern Railway Company	W. Bell, Architect, Newcastle-on-Tyne	do.
Ironwork, &c., at Gasworks	Padiham U.D.C.	A. J. Jackson, Engineer, Gasworks, Padiham	do
Fireclay Materials, Pipes, &c., at Gasworks	do.	do.	do.
Surveyor's Materials	Gelligaer R.D.C.	W. Bevan, Surveyor, Deri, via Cardiff	do.
*Wrought-iron Fencing, &c.	Watford U.D.C.	Engineer to the Council, 14, High-street, Watford, Herts	do.
*Joinery Work	Guardians, St. George-in-the-East	R. S. Tasker, 58, John-street, Bedford-row, W.C.	Nov. 6
Alterations, &c., to Inn, Hebden Bridge	.....	Walsh & Nicholas, Architects, Halifax	do.
Additions to Hotel, Cluny, N.B.	Edinburgh Lunacy Board	A. Mackenzie, Architect, County Buildings, Kingussie	do.
Additions to Infirmary, Bangour	Kinsale R.D.C.	H. J. Blanc, Architect, 25, Rutland-square, Edinburgh	do.
Thirteen Cottages	Llandudno Pier Company	J. Murphy, Workhouse, Kinsale, Ireland	do.
Alteration to Landing Stage, &c.	Cromer U.D.C.	J. J. Webster, Civil Engineer, Victoria-street S.W.	do.
Well, Metton	Middlesbrough Corporation	J. C. Melliss, C.E., 264, Gresham House, Old Broad-street, E.C.	do.
Stable, &c., Albert Park	.....	F. Baker, Civil Engineer, Municipal Buildings, Middlesbrough	Nov. 7
Hospital, Old Rattray	Glamorgan County Council	L. & J. Falconer, Architects, Blairgowrie, N.B.	Nov. 8
Additions to Asylum, Ballinasloe	Huntingdon U.D.C.	J. Young, Lunatic Asylum, Ballinasloe	do.
Additions to Town Hall, Bridgend	Fermoy R.D.C.	T. M. Franklen, County Offices, Cardiff	do.
Laying Cast-iron Pipe	Batley Corporation	R. E. Middleton, Civil Engineer, 17, Victoria-street, S.W.	do.
Cottages, &c.	Manchester Corporation	P. O'Neill, Council Offices, Fermoy	do.
Additions to Town Hall	Brighouse (Yorks) Town Council	W. Hanstock & Son, Architects, Branch-road, Batley	do.
Wall, &c., at Electricity Works	Walsall R.D.C.	City Surveyor, Town Hall, Manchester	Nov. 10
Road Works, Clifton-road	Glyncorrwg U.D.C.	S. S. Haywood, Borough Surveyor, Brighouse	do.
Sewers, Daw End	Brighouse Corporation	F. W. Mager, Civil Engineer, Aldridge, Walsall	do.
Steel Works, Tunnel-terrace	Walsall R.D.C.	W. P. Jones, Surveyor, Cwmmer, Port Talbot	do.
Sewerage Works, Queen-street	Metropolitan Borough of Islington	S. S. Haywood, Borough Engineer, Brighouse	do.
Stables, &c., Daw End, Rushall	Barnsley Corporation	F. W. Mager, Civil Engineer, Aldridge, Walsall	do.
*Alterations in Strong Rooms, Town Hall	Market Harborough R.D.C.	Borough Engineer, Town Hall, Upper-street, N.	do.
Outbuildings, &c., Locke Park	Middlesex County Council	J. H. Taylor, Civil Engineer, Manor House, Barnsley	Nov. 11
Sewers, &c.	Lambeth Guardians	J. B. Everard, Civil Engineer, 6, Millstone-lane, Leicester	do.
*Additions to Polytechnic, Priory Park-rd., Willesden	Cardiff Corporation	The County Architect, Middlesex Guildhall, Westminster	do
*Outside Staircases at Norwood Schools	Northallerton R.D.C.	Guardians' Offices, Brook-street, Kennington-road, S.E.	Nov. 12
Offices, Harroby-street, &c.	Hartlepool Gas Co.	W. Harpur, Civil Engineer, Town Hall, Cardiff	do.
Road Works	Borough of Hampstead	Fairbank & Son, Civil Engineers, Lendal, York	do.
Trenching Works	Borough of Paddington	Martin & Fenwick, Engineers, 1, Park-place, Leeds	do.
*Stable Foundations	County Borough of Croydon	Borough Engineer, Town Hall, Haverstock Hill, N.W.	Nov. 13
*Convenience at Paddington Recreation Ground	Borough of Lewisham	Borough Surveyor, Town Hall, Paddington, W.	Nov. 17
*Erection of Cottages and Oak Park Fencing	County of Southampton	Borough Engineer, Town Hall, Croydon	do.
*Iron Fencing	do.	Surveyor, Town Hall, Catford, S.E.	Nov. 18
*Road Improvement, Eastleigh	Guardians, City & County of Bristol	County Surveyor, The Castle, Winchester	Nov. 19
*Steel Bridges, Eastleigh	Midland Railway	do.	do.
*Block of Children's Homes, Downend	Londonderry Lunacy Commissnrs.	Clerk to the Guardians, St. Peter's Hospital, Bristol	do.
*Station Buildings at Nottingham	The Admiralty	Engineer's Office, Derby Station, or, 22, Park-row, Nottingham	Nov. 20
Buildings, Grausha	Hanwell School Board	M. A. Robinson, Architect, Londonderry	Nov. 21
*Coastguard Buildings, at Grove Point, Portland	Lewes Town Council	Works Department, Admiralty, Northumberland-avenue, W.C.	do.
*Alteration of Boston-road Schools	.....	W. Pywell, Cumberland House, Hanwell, W.	Nov. 24
Sewers, Cliffe and South Malling	.....	Borough Surveyor, Town Hall, Lewes	do.
House and Shop, Dashwood-road, Banbury	.....	J. Timms, Architect, 34, Bridge-street, Banbury	No date
Paving a Road, Bradford	.....	Mr. Bell, Bower Green Combing Co., Bower Green Shed, Bradford	do.
Business Premises, Tunnel-court, Cardiff	.....	E. G. C. Down, Architect, 31, High-street, Cardiff	do.
Caretaker's House, near Masham	Harrogate Corporation	Bland & Bown, Architects, Harrogate	do.
Additions to Christ Church Schools, Leeds	.....	Smith & Tweedale, Architects, 12, South-parade, Leeds	do.
Eleven Houses, Old Box Yard, Llanelly	.....	J. Davies & Son, Civil Engineers, Llanelly	do.
Artificial Lake, Marine Park	Southend Kursaal, Limited	J. C. Taylor, Civil Engineer, Kursaal, Southend	do.
Road Works, Hill Top House Estate, Bilton, Yorks.	Exors. of the late Mr. H. Atkinson	Bland & Bown, Architects, Harrogate	do.
Hospital	Westhoughton (Lancs.) U.D.C.	T. Partington, Council Offices, Westhoughton	do.
*New Infants' School at Portslade, Brighton	.....	E. H. Lingen Barker, 146, St. Owen's-street, Hertford	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Architects' Assistants	London County Council	1*l.* 1s. to 3*l.* 3s.	Nov. 17

Those marked with an asterisk (*) are advertised in this Number. *Competition*, —. *Contracts*, pp. lv. vi. viii. & x. *Public Appointment* xviii.

PRICES CURRENT (*Continued*).

WOOD.

	Per square. £ s. d.	£ s. d.
Prepared Flooring—		
¾ in. by 7 inch yellow matched and beaded or V-jointed boards	0 11 0	0 13 6
1 in. by 7 in. do. do. do.	0 14 0	0 18 0
⅞ in. by 7 in. white do. do.	0 10 0	0 11 6
¾ in. by 7 in. do. do. do.	0 11 6	0 13 6
6-in. at 6d. to 9d. per square less than 7-in.		

JOISTS, GIRDERS, &c.

	In London, £ s. d.	or delivered Railway Vans, per ton. £ s. d.
Rolled Steel Joists, ordinary sections	6 5 0	7 5 0
Compound Girders ,,	8 2 6	9 5 0
Angles, Tees and Channels, ordinary sections	7 17 6	8 17 6
Flitch Plates	8 5 0	8 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 2 6	8 5 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
Iron—		
Common Bars	7 15 0	8 5 0
Staffordshire Crown Bars, good merchant quality	8 5 0	8 15 0
Staffordshire "Marked Bars"	10 10 0	- - -
Mild Steel Bars	9 0 0	9 10 0
Hoop Iron, basis price	9 5 0	9 10 0
,, galvanised	16 0 0	. . .
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	10 0 0	- - -
,, ,, to 24 g.	11 0 0	- - -
,, ,, to 26 g.	12 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes 6 ft. by 2 ft. to 3 ft. to 20 g.	12 15 0	- - -
,, ,, 22 g. and 24 g.	13 5 0	- - -
,, ,, 26 g.	14 5 0	- - -
Sheet Iron, Galvanised, flat, best quality:—		
Ordinary sizes to 20 g.	16 0 0	- - -
,, ,, 22 g. and 24 g.	16 10 0	- - -
,, ,, 26 g.	18 0 0	- - -
Galvanised Corrugated Sheets:—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 15 0	- - -
,, ,, 22 g. and 24 g.	13 5 0	- - -
,, ,, 26 g.	14 5 0	- - -
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12 0 0	- - -
,, ,, 22 g. and 24 g.	13 0 0	- - -
,, ,, 26 g.	14 5 0	- - -
Cut nails, 3 in. to 6 in.	9 5 0	9 15 0
(Under 3 in. usual trade extras.)		

LEAD, &c.

	Per ton in London. £ s. d.	£ s. d.
Lead—Sheet, English, 3 lbs. & up.	13 7 6	- - -
Pipe in coils	13 17 6	- - -
Soil Pipe	16 7 6	- - -
Compo Pipe	16 7 6	- - -
Zinc—Sheet—		
Vieille Montagne ton	25 0 0	- - -
Silesian	24 10 0	- - -
Copper—		
Strong Sheet per lb	0 0 10	- - -
Thin ,,	0 0 11	- - -
Copper nails ,,	0 0 11	- - -
Brass—		
Strong Sheet ,,	0 0 9	- - -
Thin ,,	0 0 10	- - -
Tin—English Ingots ,,	0 1 3	- - -
Solder—Plumbers' ,,	0 0 6½	- - -
Tinmen's ,,	0 0 8½	- - -
Blowpipe ,,	0 0 9½	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	1¾d. ,, ,,
21 oz. thirds	3¼d. ,, ,,
,, fourths	2¾d. ,, ,,
26 oz. thirds	4d. ,, ,,
,, fourths	3½d. ,, ,,
32 oz. thirds	5d. ,, ,,
,, fourths	4½d. ,, ,,
Fluted sheet, 15 oz.	3d. ,, ,,
,, 21 ,,	4d. ,, ,,
½ Hartley's Rolled Plate	1½d. ,, ,,
⅝ ,, ,, ,,	2d. ,, ,,
¾ ,, ,, ,,	2½d. ,, ,,

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes or barrels	per gallon	0 2 5
,, ,, ,, in drums	,,	0 2 8
Boiled ,, ,, in pipes or barrels	,,	0 2 7
,, ,, ,, in drums	,,	0 2 10
Turpentine, in barrels	,,	0 3 2
,, in drums	,,	0 3 4
Genuine Ground English White Lead	per ton	21 0 0
Red Lead, Dry	,,	20 0 0
Best Linseed Oil Putty	per cwt.	0 8 6
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 6
Superfine Hard-drying Oak, for Seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0

PRICES CURRENT (*Continued*).

VARNISHES, &c.

	Per gallon. £ s. d.
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TO CORRESPONDENTS.

A. A. (Amount should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BIRCHINGTON-ON-SEA.—For the erection of a pair of semi-detached houses, for Mr. J. C. Pidgeon. Mr. H. Payne Wyatt, architect, 124, Brixton-road, London, S.W.:—

A. Braun, Goodmayes, Essex* £1,512

[Exclusive of fittings.]

BRISTOL (Fishponds).—For erecting north aisle and vestry to parish church. Mr. E. H. Lingen Barker, architect:—

Church	£2,061	Clark, Fishponds*	£1,636
Stephens & Bastow	1,943	Walters	1,616
Hayes	1,749		

CHELMSFORD.—For the erection of new laboratories at Chelmsford, for the Essex County Council. Mr. Frank Whitmore, County Architect, Chelmsford:—

Smith & Sons	£10,735	Harris & Rowe	£9,575
Dobson	10,479	F. Bennett	9,490
Silas Parmenter	10,329	F. Johnson	9,300
Henry Potter	9,910	Davis & Leaney	9,293
Everett & Son	9,869	John Rayner	9,232
Coulson & Lofts	9,832	Ernest West	8,843
Grimwood & Sons	9,798	Shillito & Son, Bury St. Edmunds*	8,800
W. Chambers	9,649		

CHELMSFORD.—For the erection of new laboratories at Chelmsford, for the Essex County Council. Mr. Frank Whitmore, County Architect, Chelmsford:—

Bastow & Co.	£2,995	F. Bennett	£2,370
Grimwood & Sons	2,889	Davis & Leaney	2,300
Smith & Sons	2,775	W. Chambers	2,295
S. Parmenter	2,595	F. Johnson	2,260
H. Potter	2,525	E. West	2,243
Everett & Sons	2,438	S. E. Moss	2,200 17
Dobson & Son	2,436	Shillito & Sons, Bury St. Edmunds*	2,200
Coulson & Lofts	2,400		
Harris & Rowe	2,396		

EDMONTON.—For building new lavatory at Millfield House Schools, for the Guardians of the Strand Union. Mr. A. A. Kekwick, architect, 13, Outer Temple, Strand:—

S. Kind	£342	Bate Bros.	£238
T. G. Sharpington	325	Sands, Palmer, & Co.	217
Barnes & Co.	287 10	Finch & Co., Ltd.	207
T. Pearce	272	J. Pavey, Wood Green, N.*	170
A. Monk	239		

HUNSTANTON.—For the Le Strange Arms Hotel, Hunstanton, Norfolk. Mr. H. J. Green, architect, 31, Castle Meadow, Norwich:—

F. Giddings	£7,639	Reuben Shanks	£6,295
Renaut Bros.	6,840	Youngs & Son	6,170
P. Banyard	6,691	John Cracknell	6,095

IVYBRIDGE (Devon).—For the erection of masonry wall, Lee Mill, for the Plympton St. Mary Rural District Council. Mr. F. A. Clark, surveyor, Old Town-street, Plymouth:—

A. Tozer	£288 15	Bennett Bros.	£177 10
J. Allen	267	G. B. Andrews, Ivybridge*	150
R. J. Hortop	198 11		
W. E. Bennett	179 10		

[Estimated cost of work, £160.]

KING'S LYNN.—For alterations and additions to Thurlow House, King's Lynn. Mr. H. J. Green, architect and surveyor, 31, Castle Meadow, Norwich:—

Renant Bros.	£2,494	J. Cracknell	£2,276
R. Dye	2,401	R. Shanks	2,250

LONDON.—For the erection of a detached house and small stable at Sunray-avenue, Herne Hill, S.E., for Mr. E. Miller. Mr. H. Payne Wyatt, 124, Brixton-road, S.W., architect:—

W. D. Palmer, 75, Dulwich-road, S.E.* ..£2,514

LONDON.—For well and sump pit, at the electricity supply station, for the Metropolitan Borough of Stepney. Mr. M. W. Jameson, Borough Engineer:—

T. & W. Cole, Ltd.	£525	Griffiths & Co., Ltd., Bishopsgate-street Without, E.C.*	£180
Carlton Iron Foundry Co.	399 18		
E. & F. Wright	325		

LONDON.—For the supply and erection of two electrical car-traversers to be used at the Clapham and Balham car-sheds respectively, for the purpose of removing cars from one set of lines to another, for the London County Council:—

Green & Son, Ltd.	£1,400
Blackwell & Co., Ltd.	1,170
C. & A. Musker (1901), Ltd.	1,040
British Thomson Houston Co., Ltd.	964
Ransomes & Rapier, Ltd.	920
Dick, Kerr, & Co., London*	900

LONDON.—For the South-Eastern Weights and Measures Office and Coroner's Court, Greenwich, for the London County Council:—

Henry Kent	£6,951 13 8
B. E. Nightingale	6,797 0 0
Wm Downs	6,543 5 6
Harry Groves	6,503 0 0
Martin Wells & Co.	6,334 6 2
General Builders, Ltd.	6,276 6 7
H. L. Holloway	6,178 0 0
Marsland & Sons	6,159 5 3
Stimpson & Co.	6,085 0 0
J. & C. Bowyer	6,072 0 0
T. G. Sharpington*	5,922 9 8
R. A. Lowe	5,919 5 6
Architect's estimate	6,381 0 0

LONDON.—For labourers' cottages and lodges, Farmfield Reformatory, for the London County Council:—

Haslemere Builders, Ltd.* £2,526

LONDON.—For the erection of the Chelsea Dispensary, Manor-street, S.W., for the Chelsea, Brompton, and Belgrave Dispensary. Messrs. Arthur W. Sheppard and J. F. Burkinshaw, architects, 21, John-street, Adelphi, W.C. Quantities by Messrs. Robinson & Roods, 8, New-court, Lincoln's Inn, W.C.:—

W. J. Picken	£3,150	Cropley Bros.	£2,697
Foster & Dicksee	2,992	Osward Craske	2,565
Holliday & Greenwood	2,837	Peacock Bros.	2,516
W. Norton	2,764 10	Stimpson & Co.*	2,440

RUGBY.—Elboro Schools. Mr. E. H. Lingen Barker, architect:—

Parnell & Son	£2,391	Linnell & Son	£2,154
Wimi & Son	2,365	Sturgess & Son	2,105
Hollowell & Son	2,200	Eastwood, Market Harborough*	2,100
Hopkins & Son	2,161		

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following lists of tenders. Mr. T. J. Bailey is the Board's Architect:—

* *Recommended for acceptance.*

MANTLE-ROAD (B and G).—Altering position of an existing partition and providing a new glazed partition, in order to redivide classrooms E and F into three rooms; together with reversing the stepped flooring in the middle room in order to obtain left light, and partitioning off a portion of this room to form passage for direct access to the side rooms:—

Spencer & Co.	£515 5	G. Kemp	£397
Rice & Son	511	Marsland & Sons	393
H. Bouneau	508	Akers & Co.	377
Maxwell Bros., Ltd.	406	J. & C. Bowyer*	372
W. Martin	405	Wake & Dean, Ltd.	369
Bulled & Co.	397		

NORTHEY-STREET. — Improvements, boys' and girls' departments—Removing staircase, cloakrooms, lavatories, and teachers' rooms; providing new halls for boys and girls about 46 ft. by 28 ft. 6 in.; new staircases; cloakrooms, teachers' rooms, lavatories; redividing and restepping, and improving lighting of existing classrooms; providing drawing classroom, 552 sq. ft. area, and science-room, 368 sq. ft. area; providing girls' water-closets and adapting existing boys' water-closets for coal-shed; heating by low-pressure hot-water apparatus; new drainage scheme. Revised accommodation: Boys, 287; girls, 295; infants, 363; total, 945. Loss of 56 places:—

			†
Willmott & Sons	£9,756	+	£25
C. Cox	9,683	+	72
F. & F. J. Wood	9,542	+	64
Killby & Gayford	9,380	+	63
Perry & Co.	9,348	+	58
Gregar & Son	9,244	+	60
Wall & Co.	9,157	+	56
Williams & Son	8,939	+	36
Treasure & Son	8,721	+	45
Outhwaite Son*	8,704	+	53

† If walls of classrooms and halls are plastered, add.

[*See also next page.*

Supply of paper COMPASS POINTS, on a running contract :—

	Per 1,000 Sets.	Per 2,000 Sets.	Per 3,000 Sets.	Per 5,000 Sets.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Hazell, Watson, & Viney, Ltd.	10 15 0	18 10 0	25 10 0	39 10 0
Henderson & Spalding	11 10 0	15 10 0	19 10 0	27 10 0
Standidge & Co., Ltd.	11 7 0	17 4 0	22 15 0	34 0 0
Tarrant & Son*	8 18 0	13 1 0	17 4 0	25 8 0

Supply of TIMBER for use in M.T. Centres, on a running contract :—

Description of Timber.	Burton, Brine, & Read, Ltd.	Cobbetts.	R. Garrard & Co.	Hahn & Co.	James Latham, Ltd.	London School Furniture Co.	W. Mallinson & Co.	S. Putney.
Battens in 8-ft. lengths, in parcels of 200 ft.—	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Basswood, 2½ in. by 1 in., per 100 ft. run ..	6 6	6 6	10 0	—	*5 9	6 6	8 6	9 0
Yellow deal, 2½ in. by 1 in. ,, ..	6 0	5 6	6 8	—	4 8	*4 6	—	10 0
Sycamore (not less than 4 in. wide)—								
⅞ in. per ft. super.	0 5½	0 6½	*0 4½	—	0 4½	0 4¾	0 8	—
¾ in. ,,	0 4½	0 5	*0 3½	—	0 4	0 4	0 6	—
⅝ in. ,,	0 3½	0 4½	*0 3	—	0 3½	0 3⅜	0 5	—
½ in. ,,	0 3	0 3½	*0 2½	—	0 2½	0 2¾	0 4	—
Bass or American whitewood (good green colour)—								
1¾ in. per ft. super.	0 6	0 3½	0 7½	0 5½	*0 4⅝	0 5¼	0 6	0 3¾
1½ in. ,,	0 5	0 3½	0 6½	0 4½	*0 3 15/16	0 4⅝	0 5	0 3¼
1 in. ,,	0 4	0 3	0 5	0 3½	*0 3	0 3½	0 4	0 3½
¾ in. ,,	0 3½	0 2⅝	0 4	0 3½	*0 2 11/16	0 3¼	0 3½	0 3½
⅝ in. ,,	0 2¾	0 2½	0 3½	0 2¾	*0 2¼	0 3	0 3¼	0 3¼

PUBLISHER'S NOTICES.

Telegraphic Address, "THE BUILDER," LONDON.

CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS, &c. &c.

Six lines, or under.....6s. 0d.
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PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps *must not* be sent, but all sums should be remitted by Postal Orders, payable to DOUGLAS FOURDRINIER, and addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE noon on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder" may have *Replies addressed to the Office*, Catherine-street, Covent Garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES, { NINEPENCE EACH. By Post (carefully packed) 1s.

B. NOWELL & CO.
STONE MERCHANTS & CONTRACTORS.
Chief Office.—*Warwick Road, KENSINGTON.*
Norway, Guernsey, and Leicestershire Granite, Kerb, Pitching, and Yorkshire Stone.
ESTIMATES GIVEN FOR EVERY DESCRIPTION OF ROAD MAKING.

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"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to DOUGLAS FOURDRINIER) should be addressed to the publisher of "THE BUILDER," Catherine-street, W.C.

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W. H. Lascelles & Co.,
121, BUNHILL ROW, LONDON, E.C.
Telephone No. 1365, London Wall.
HIGH-CLASS JOINERY,
LASCELLES' CONCRETE
Architects' Designs are carried out with the greatest care.
CONSERVATORIES,
GREENHOUSES,
WOODEN BUILDINGS,
Bank, Office, & Shop Fittings.
CHURCH BENCHES & PULPITS.
ESTIMATES GIVEN ON APPLICATION.

THE BATH STONE FIRMS, Ltd.
BATH.
FOR ALL THE PROVED KINDS OF BATH STONE.
FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE.
DOULTING STONE.
The Ham Hill and Doulting Stone Co.
(Incorporating the Ham Hill Stone Co. and C. Trask & Son, The Doulting Stone Co.)
Chief Office :—Norton, Stoke-under-Ham, Somerset.
London Agent :—Mr. E. A. Williams, 16, Craven-street, Strand.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co.

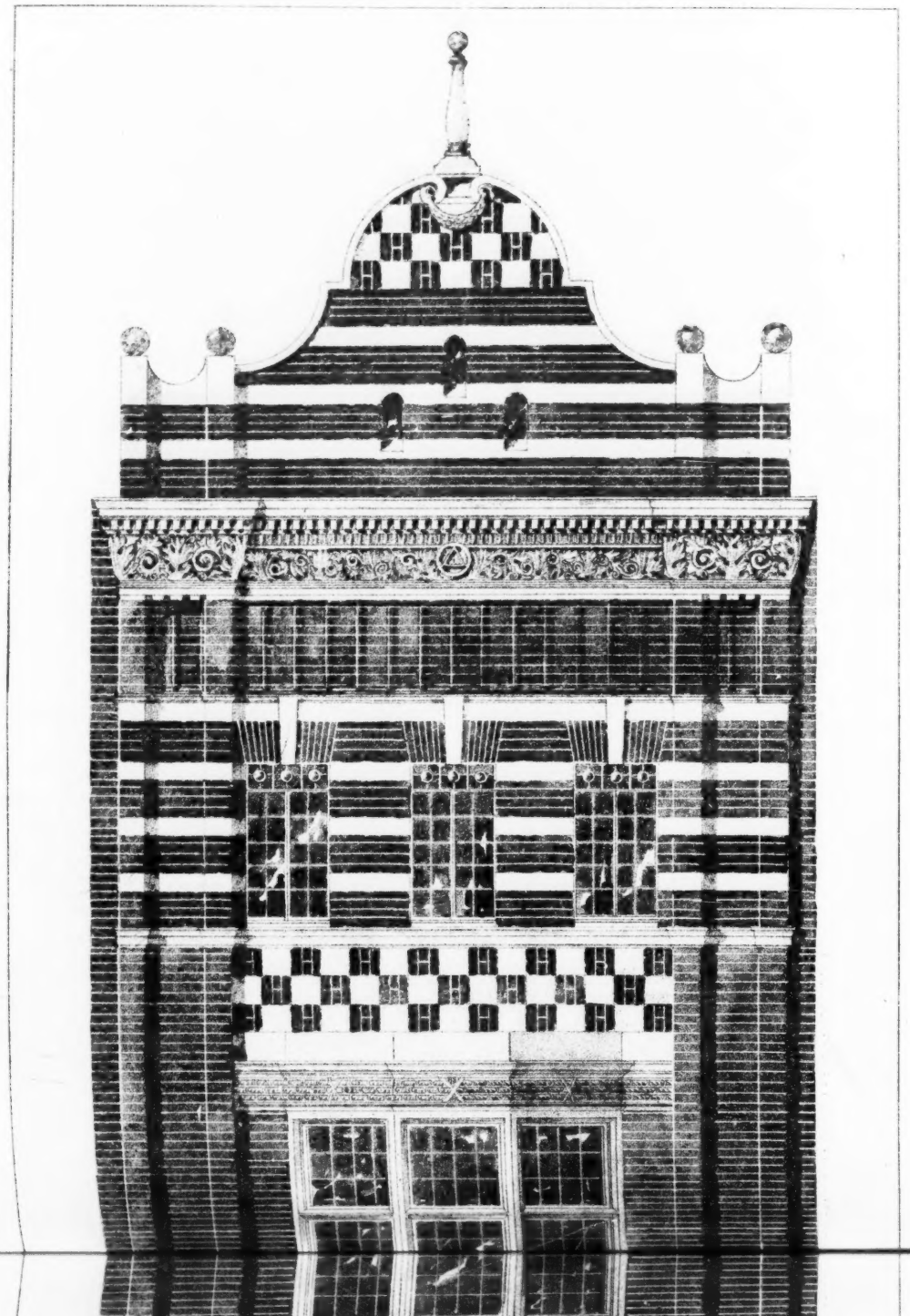
SPRAGUE & CO.'S, Ltd.,
"INK-PHOTO" PROCESS,
4 & 5, East Harding-street,
Fetter Lane, E.C.

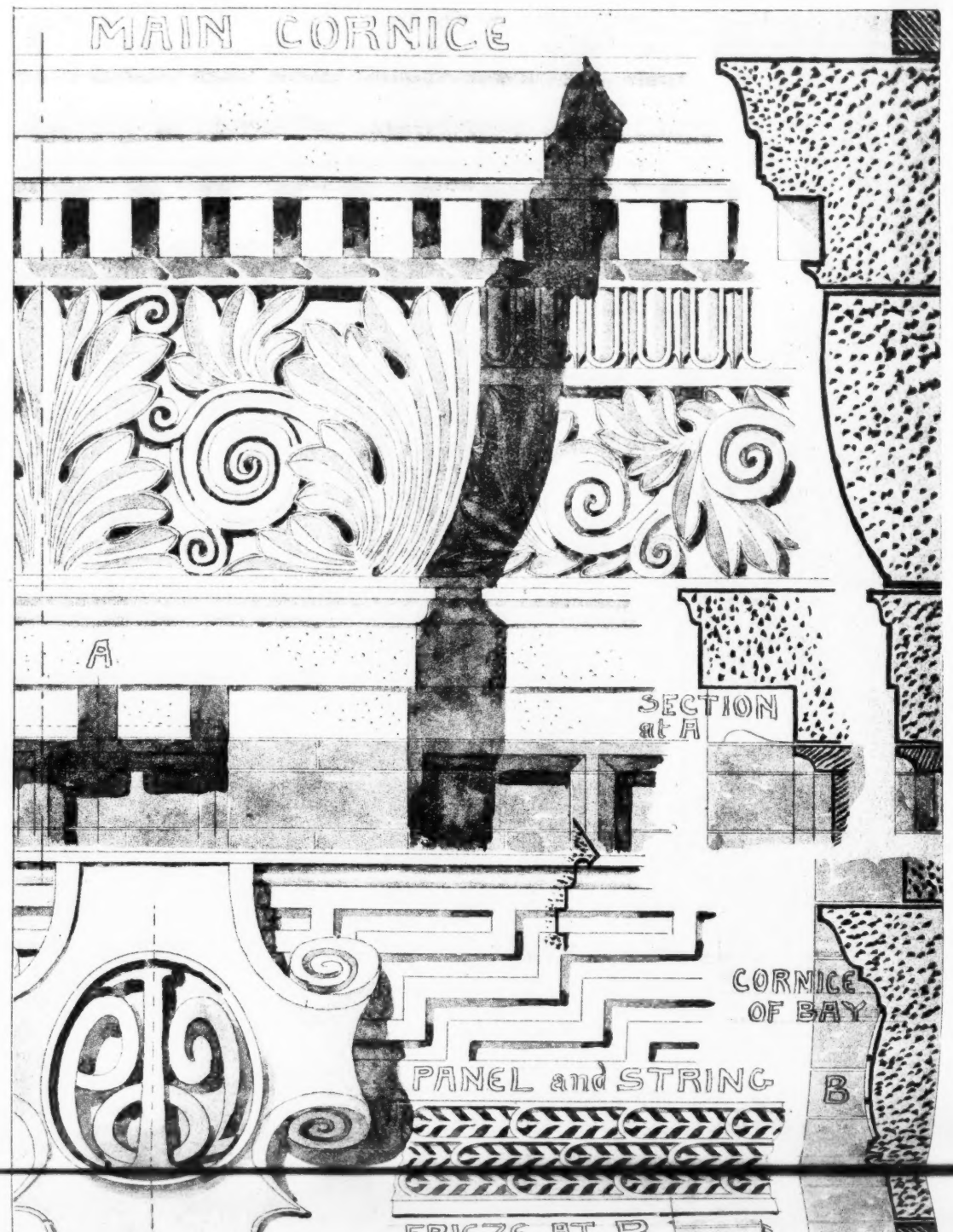
QUANTITIES, &c., LITHOGRAPHED accurately and with despatch. [Telephone No. 414 Westminster.
METCHIM & SON { 8, PRINCES STREET, ST. GEORGE'S ST. WESTMINSTER
"QUANTITY SURVEYORS' DIARY AND TABLES, For 1902, price 6d. post 7d. In leather 1/- Post 1/1.

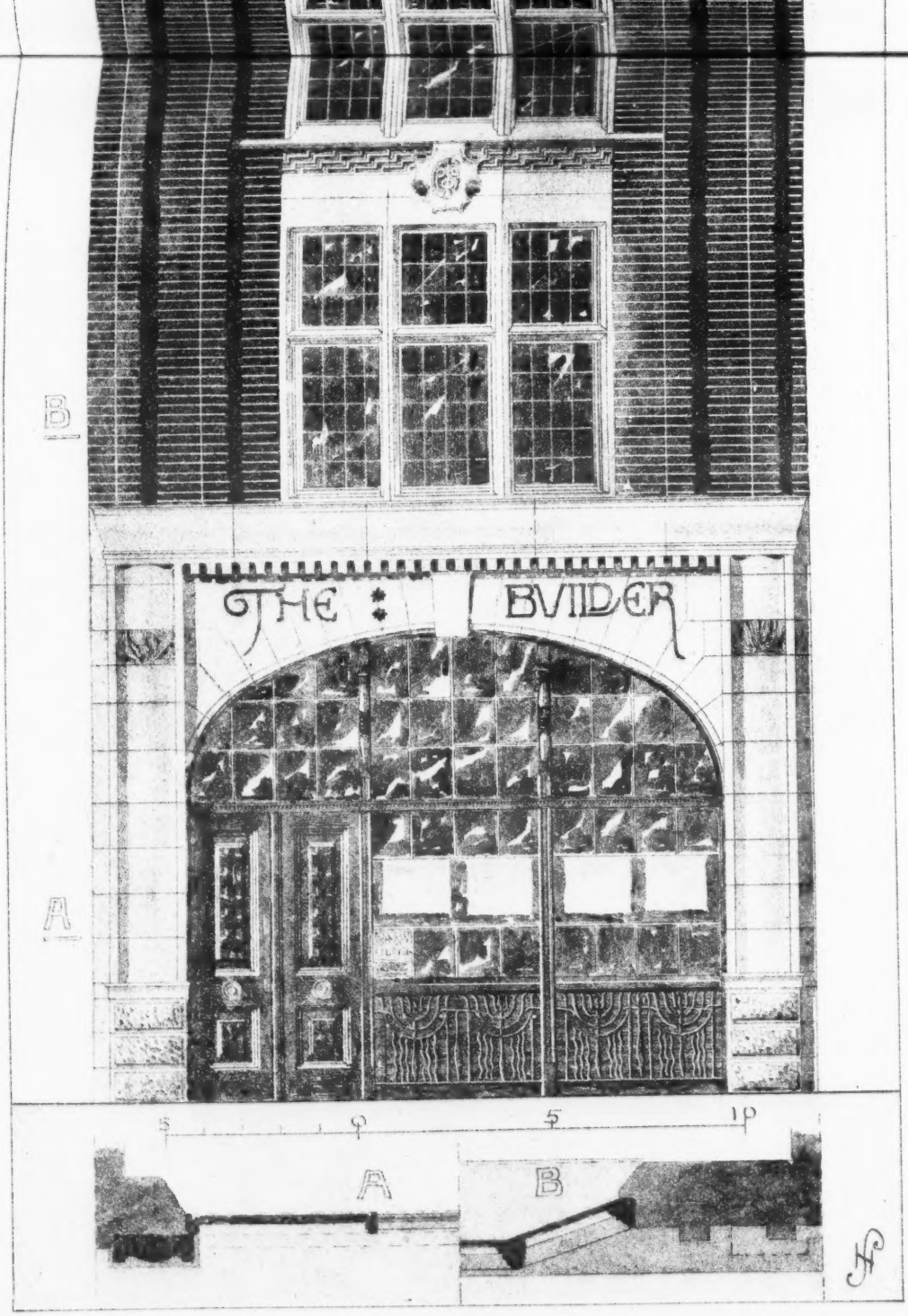
BEST BATH STONE.
Original Hartham Park Box Ground & Corsham.
EVERY BLOCK BRANDED WITH OUR REGISTERED TRADE MARK.
MARSH, SON, & GIBBS, Ltd.
Chief Office : Box, Wilts.
Branch Office : York Chambers, Bath.
WORKED STONE A SPECIALITY.

PILKINGTON & CO
(ESTABLISHED 1838),
MONUMENT CHAMBERS,
KING WILLIAM STREET, LONDON, E.C.
Telephone No., 2751 Avenue.
Registered Trade Mark,
Poloncean Asphalte.
PATENT ASPHALTE and FELT ROOFING.
ACID-RESISTING ASPHALTE.
WHITE SILICA PAVING.
PYRIMONT SEYSSEL ASPHALTE.

EWART'S
"EMPRESS" SMOKE CURE
NOISELESS
During an experience of 68 YEARS we have found NO COWL so successful as the "EMPRESS" Expert Advice free in London Rail Fare only in Country
EWART & SON LTD. 346-350 EUSTON ROAD LONDON N.W.
Write for Catalogue "Section 30" Post Free




MAIN CORNICE
A
SECTION at A
CORNICE OF BAY
PANEL and STRING
B



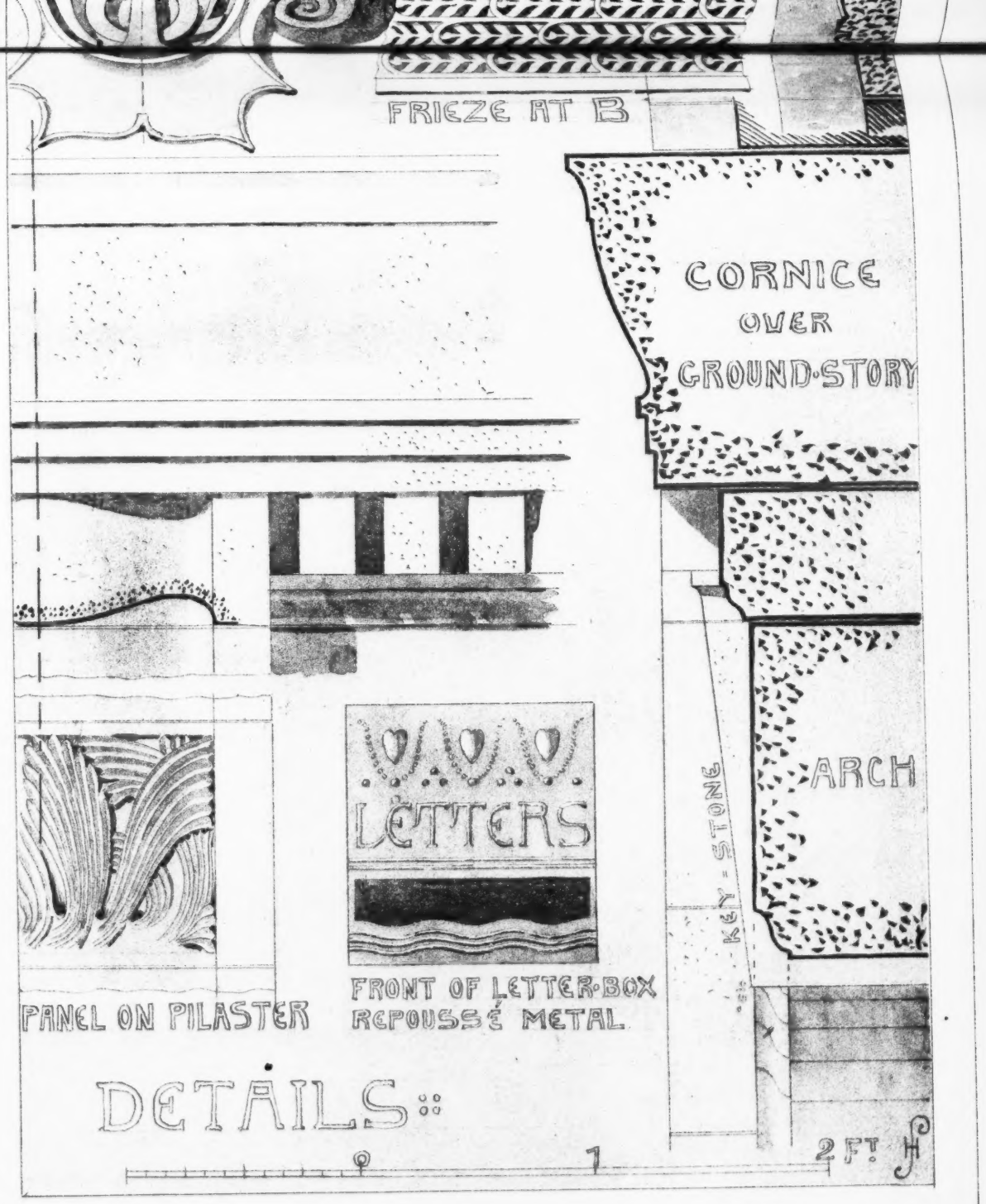
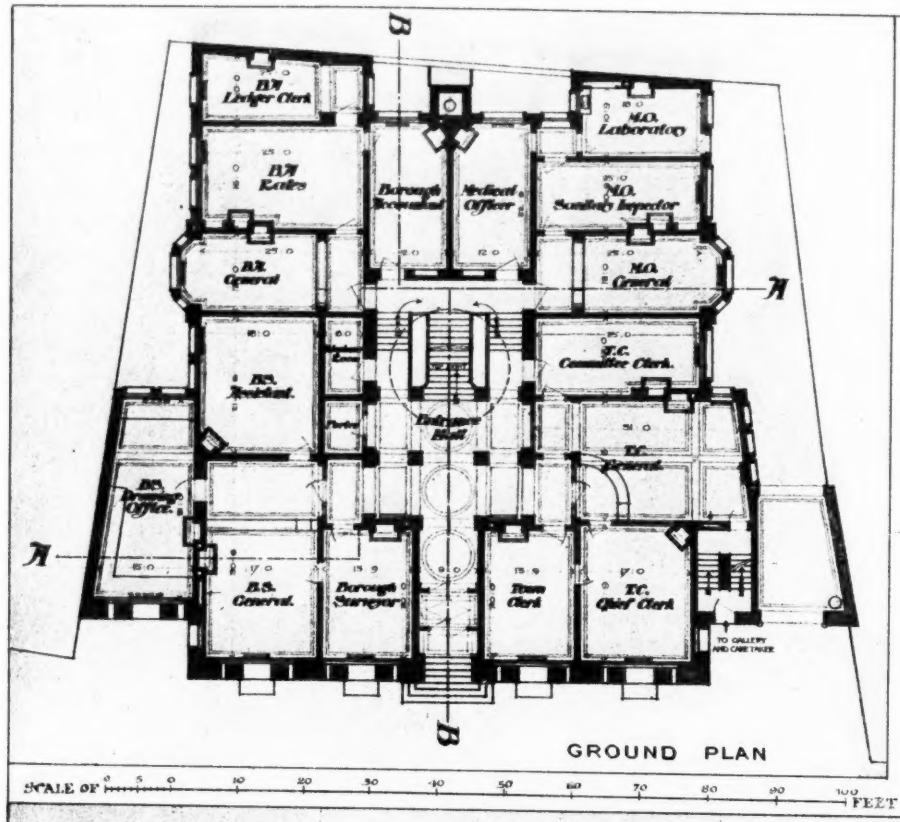
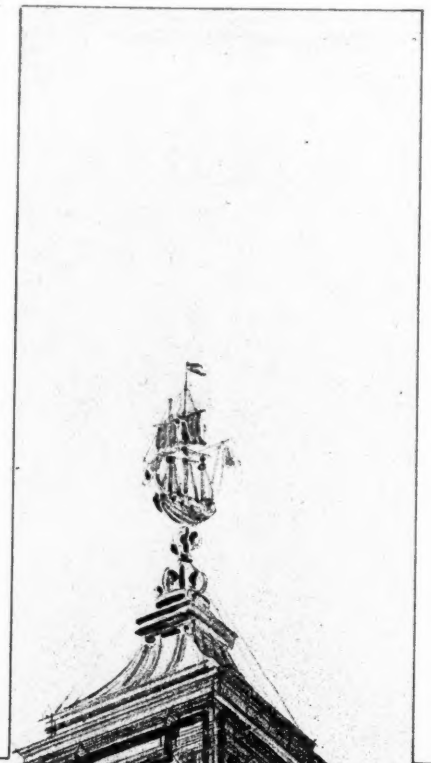
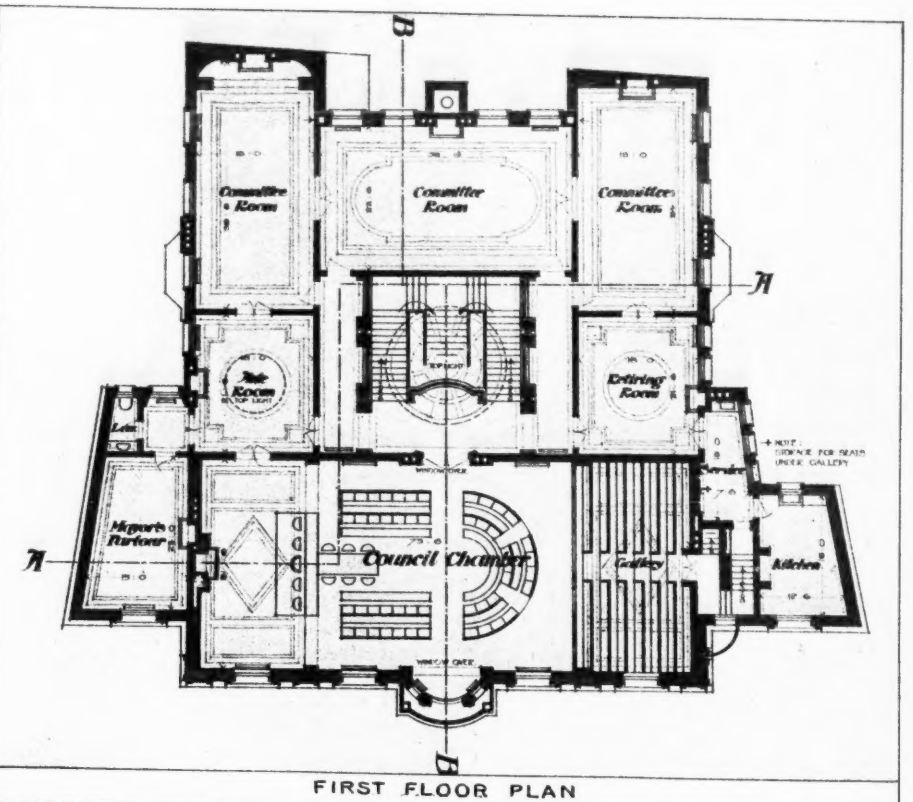


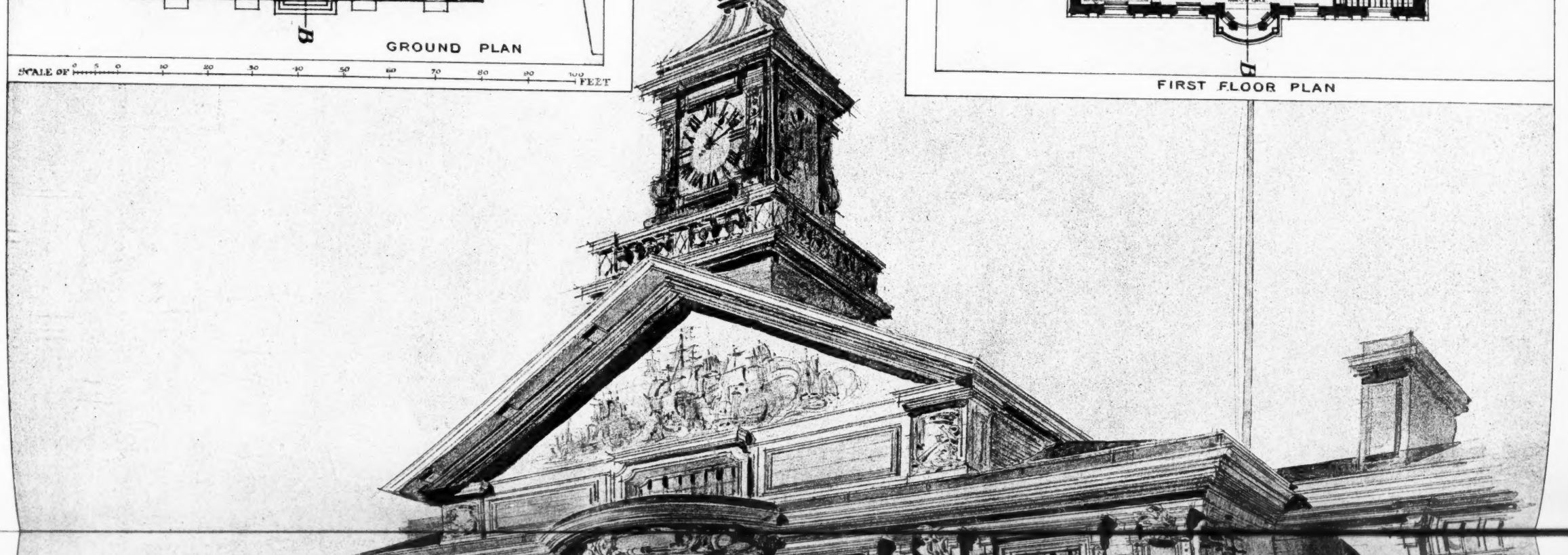
PHOTO-LITHO SPRAGUE & CO. LTD. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

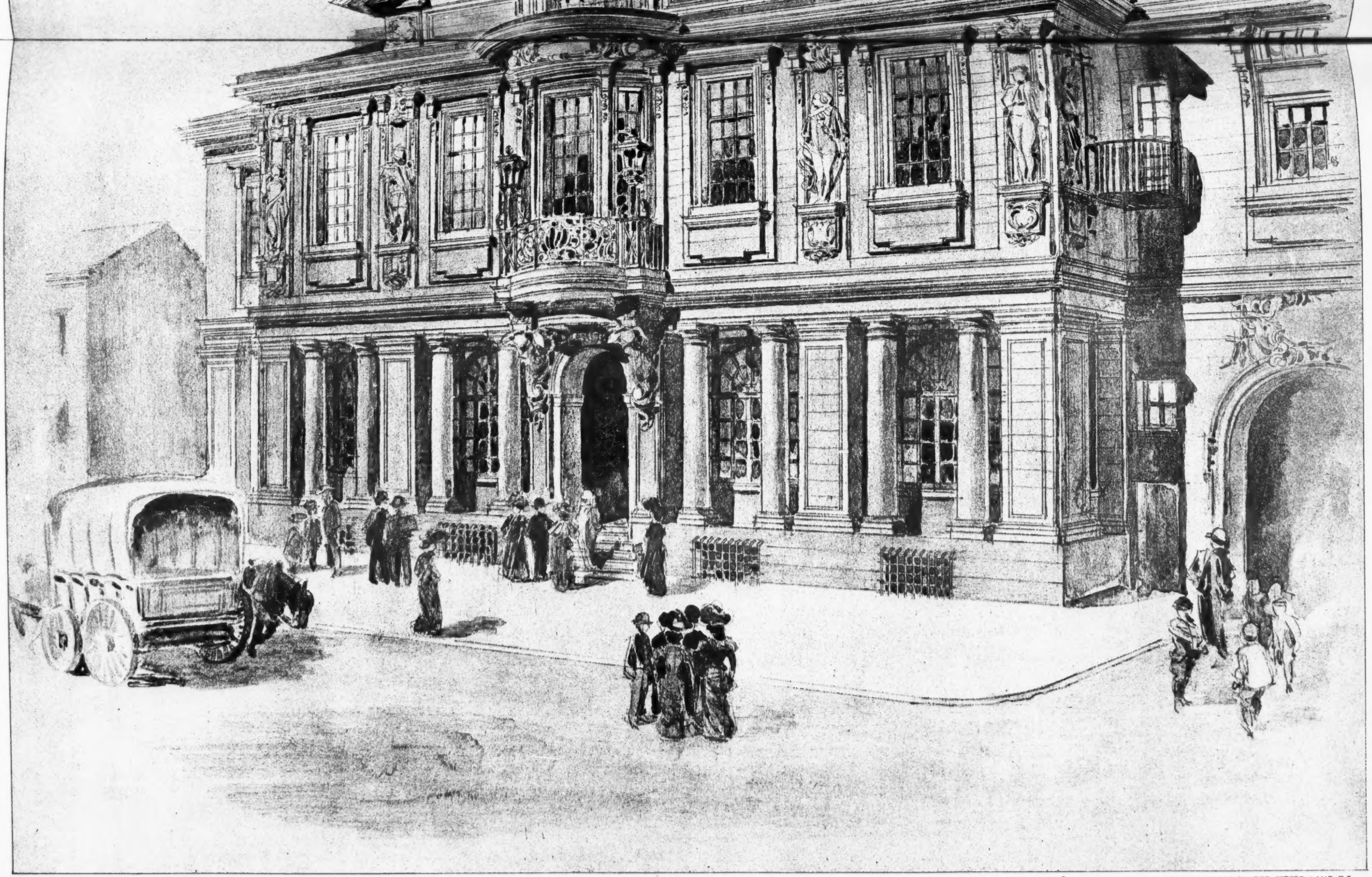
NEW FRONT, *BUILDER* OFFICE, CATHERINE STREET.—Mr. H. H. Statham, F.R.I.B.A., Architect.


B
B.W. Ledger Clerk
M.O. Laboratory
B.W. Rates
Borough Accountant
Medical Officer
M.O. Sanitary Inspector
B.W. General
M.O. General
A
T.C. Committee Clerk.
B.W. Assistant
Entrance Hall
Porch
T.C. General
B.W. Borough Officer
B.S. General
Borough Surveyor
Town Clerk
T.C. Chief Clerk
TO GALLERY AND CARETAKER'S
B
GROUND PLAN
SCALE OF 0 5 0 10 20 30 40 50 60 70 80 90 100 FEET




B
Committee Room
Committee Room
Committee Room
A
Ante Room
Retiring Room
Lift
Mayor's Parlour
Council Chamber
Gallery
Kitchen
B
FIRST FLOOR PLAN





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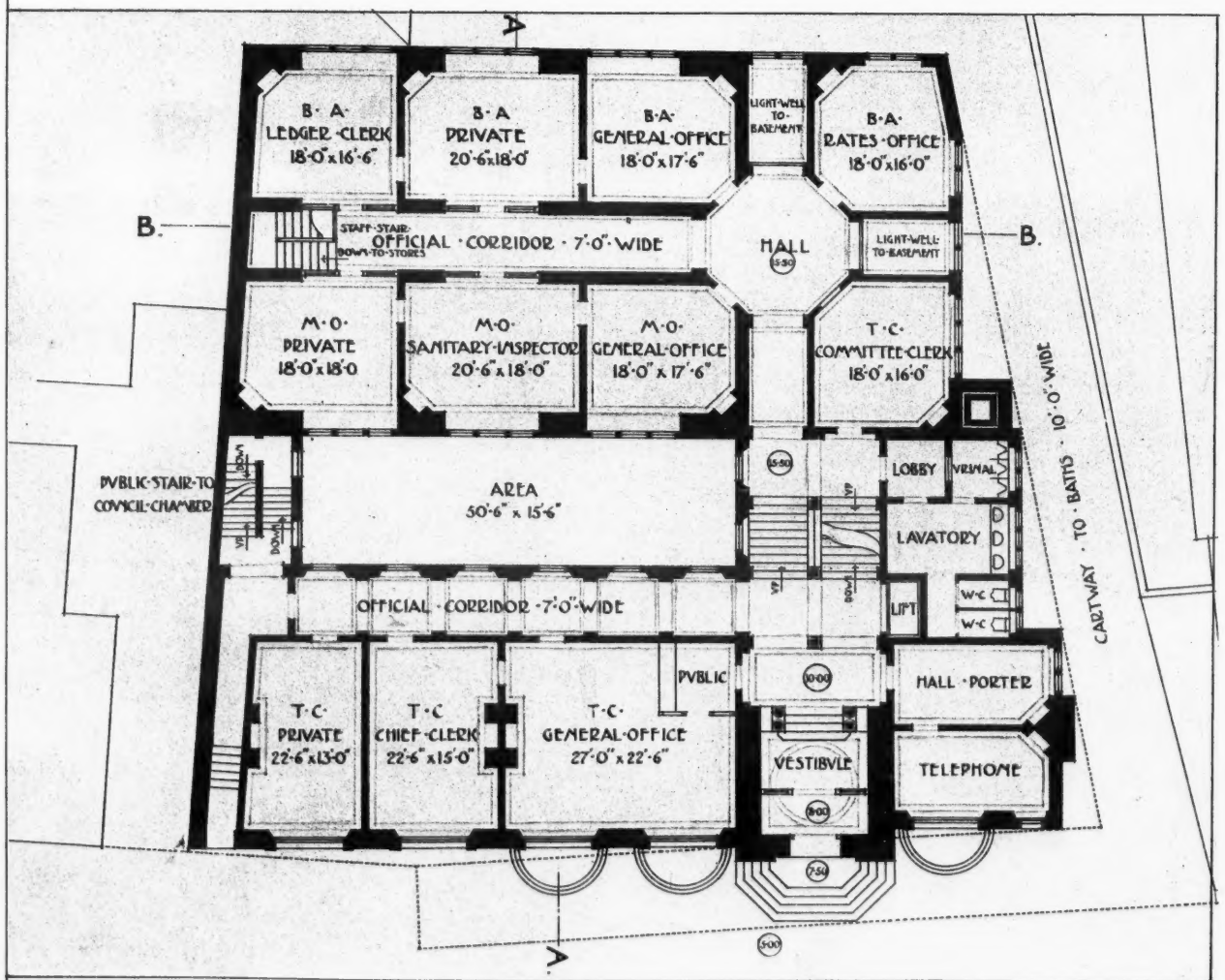
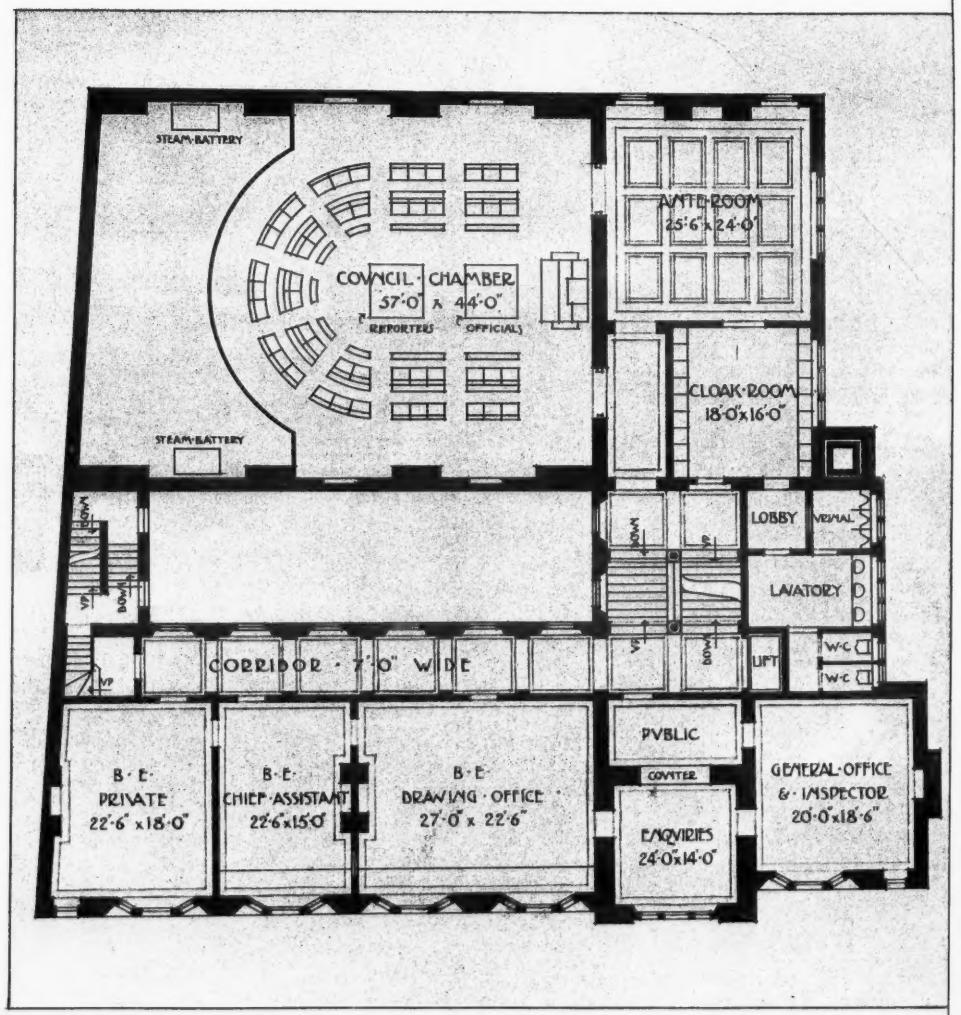
DEPTFORD MUNICIPAL BUILDINGS COMPETITION: FIRST PREMIATED DESIGN.—By Messrs. Lanchester, Stewart, & Rickards.



GROVND PLAN.



FIRST FLOOR PLAN.

SCALE OF 0 5 0 10 20 30 40 50 60 70 80 90 100 FEET

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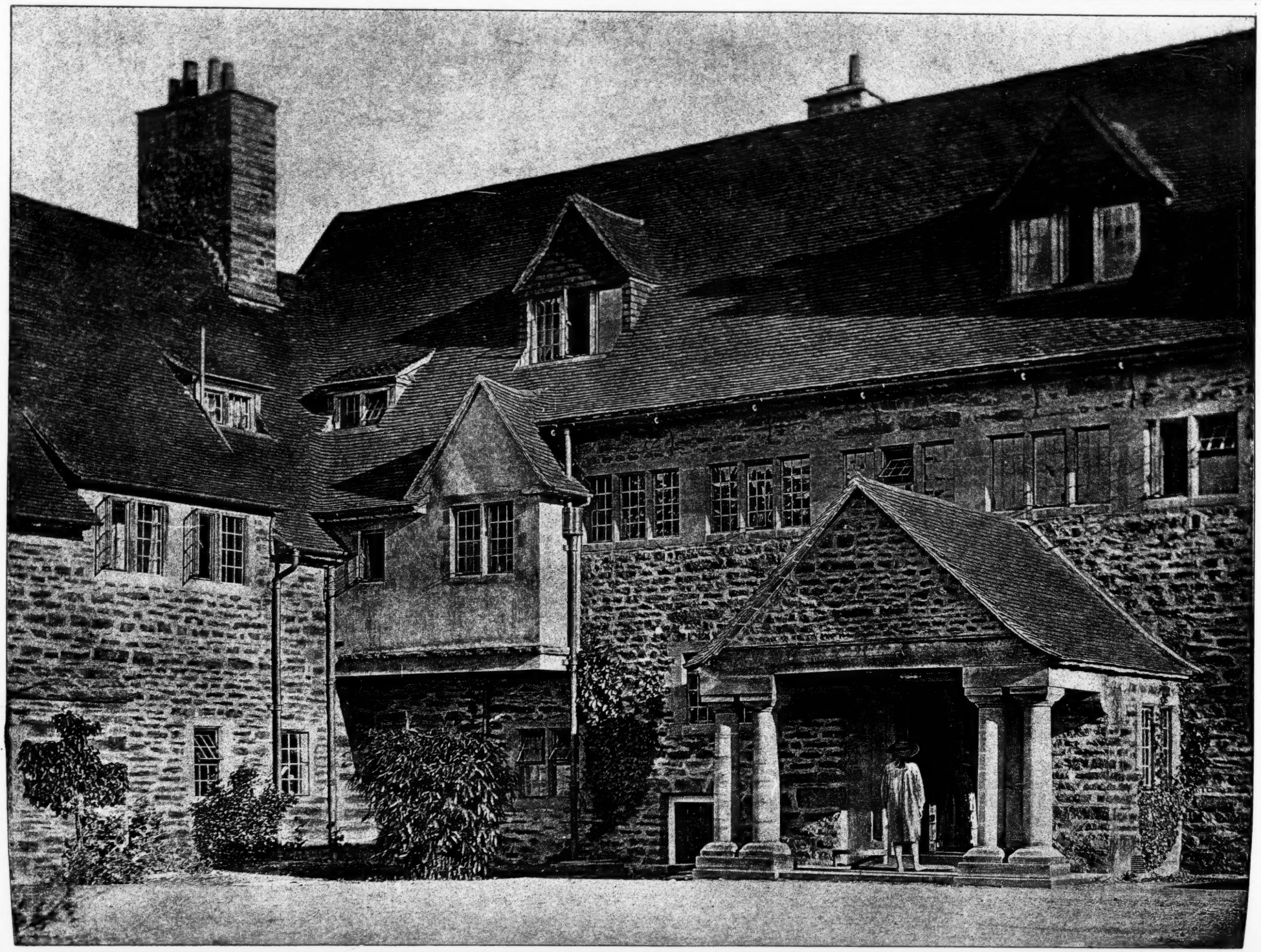
DEPTFORD MUNICIPAL BUILDINGS COMPETITION: SECOND PREMIATED DESIGN.—By Messrs. S. B. Russell & C. E. Mallows.



VIEW FROM NORTH-WEST.

VIEW FROM NORTH-WEST.

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VIEW FROM SOUTH-EAST.

"WESTBROOK," GODALMING, SURREY.—Messrs. Balfour & Turner, Architects